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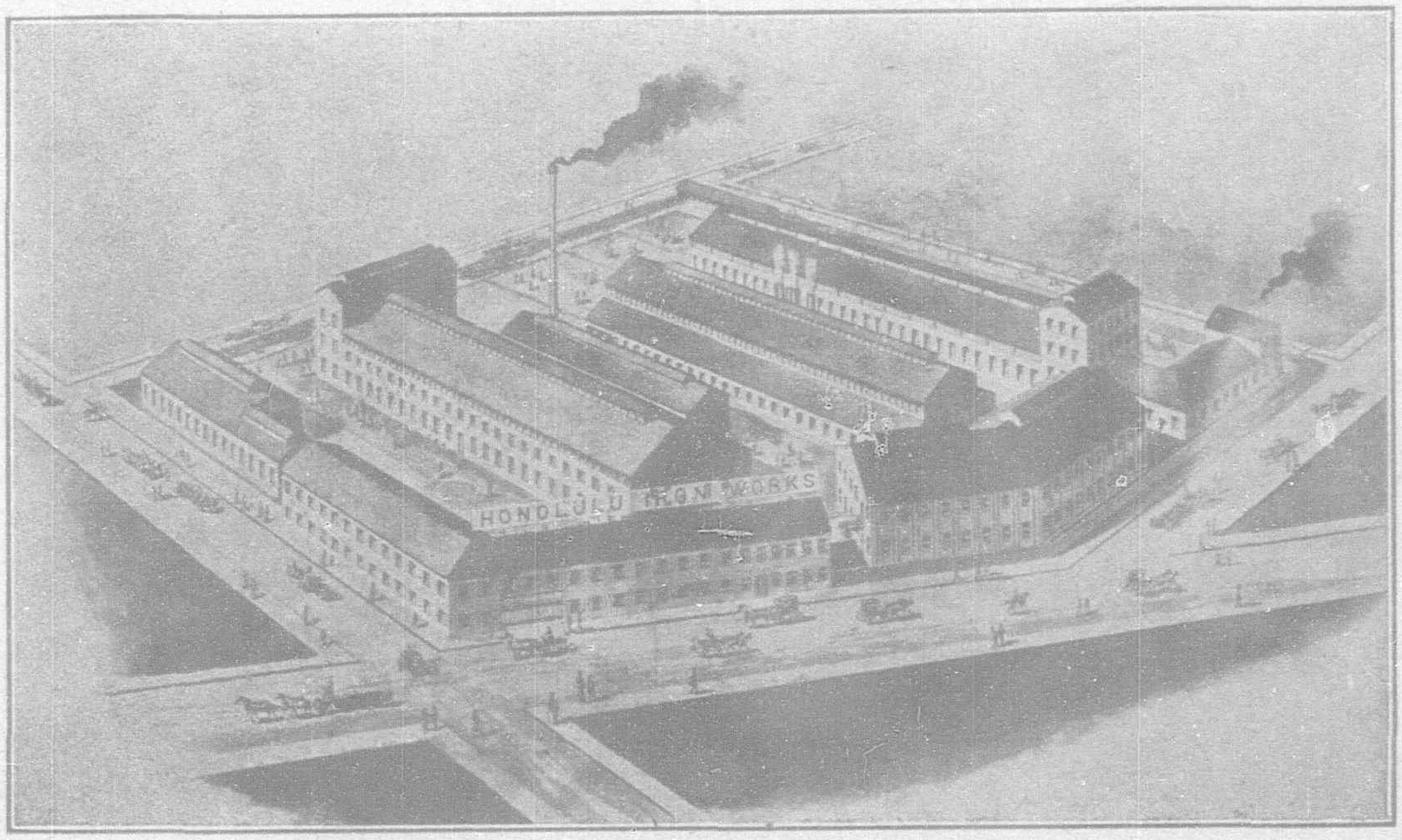

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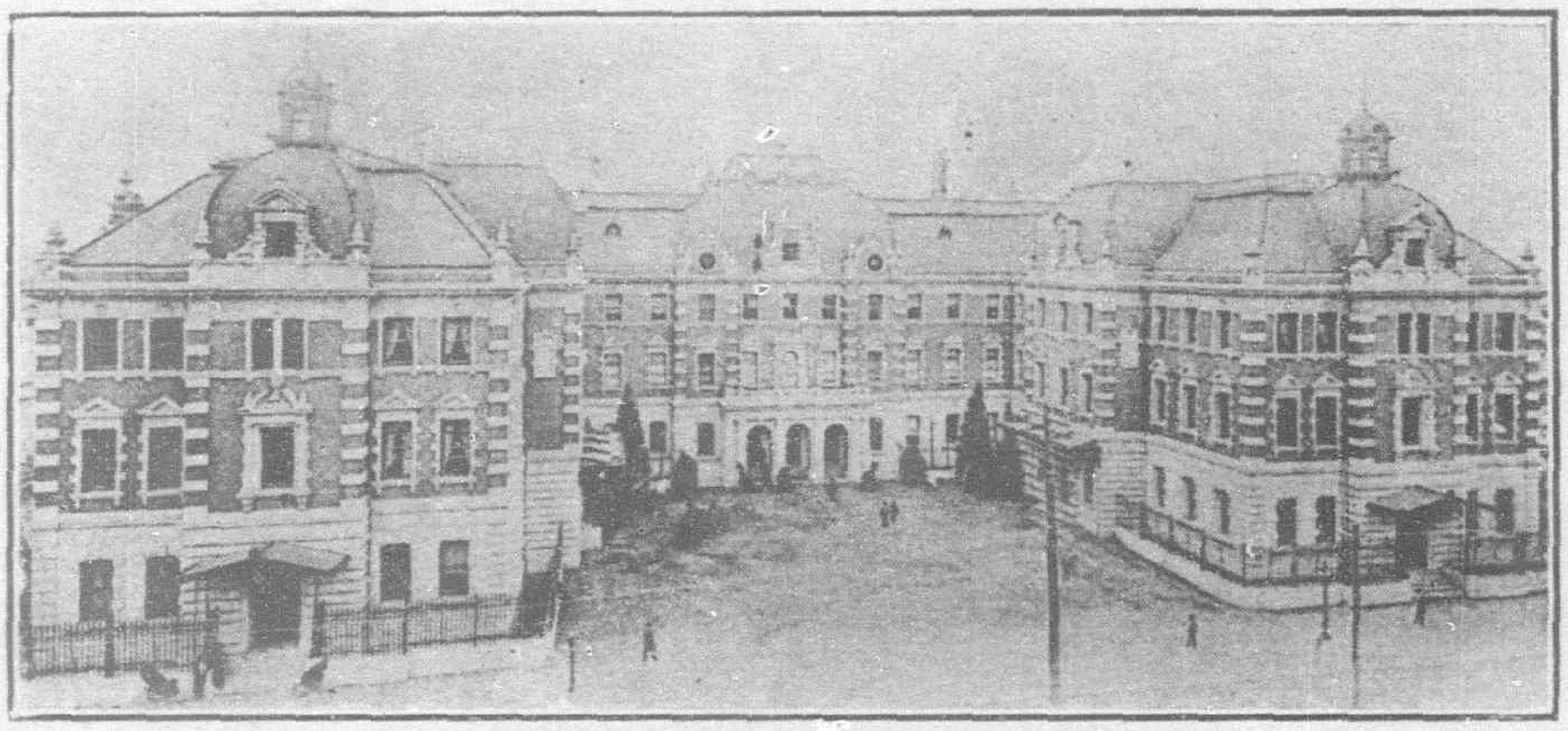

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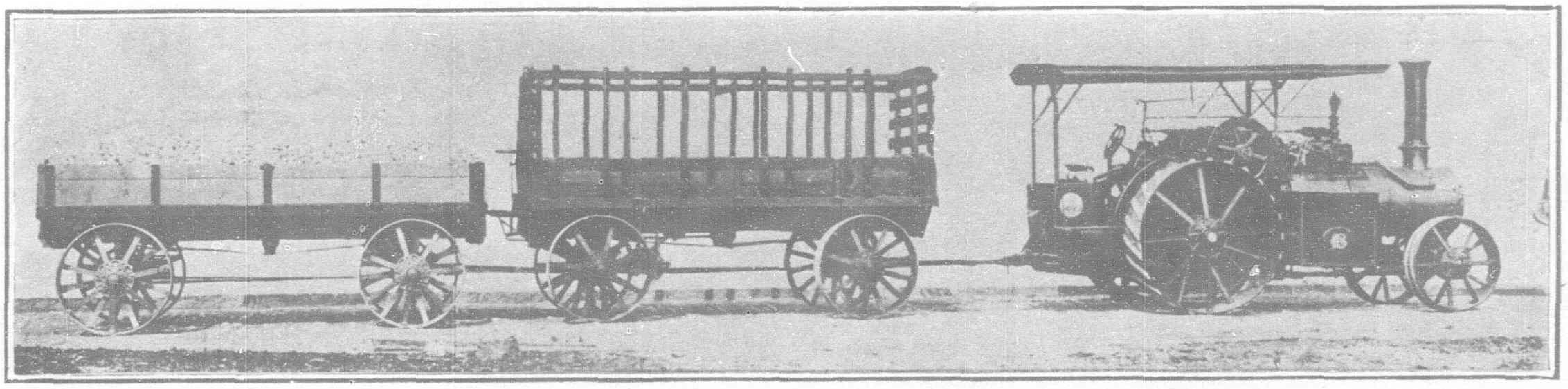

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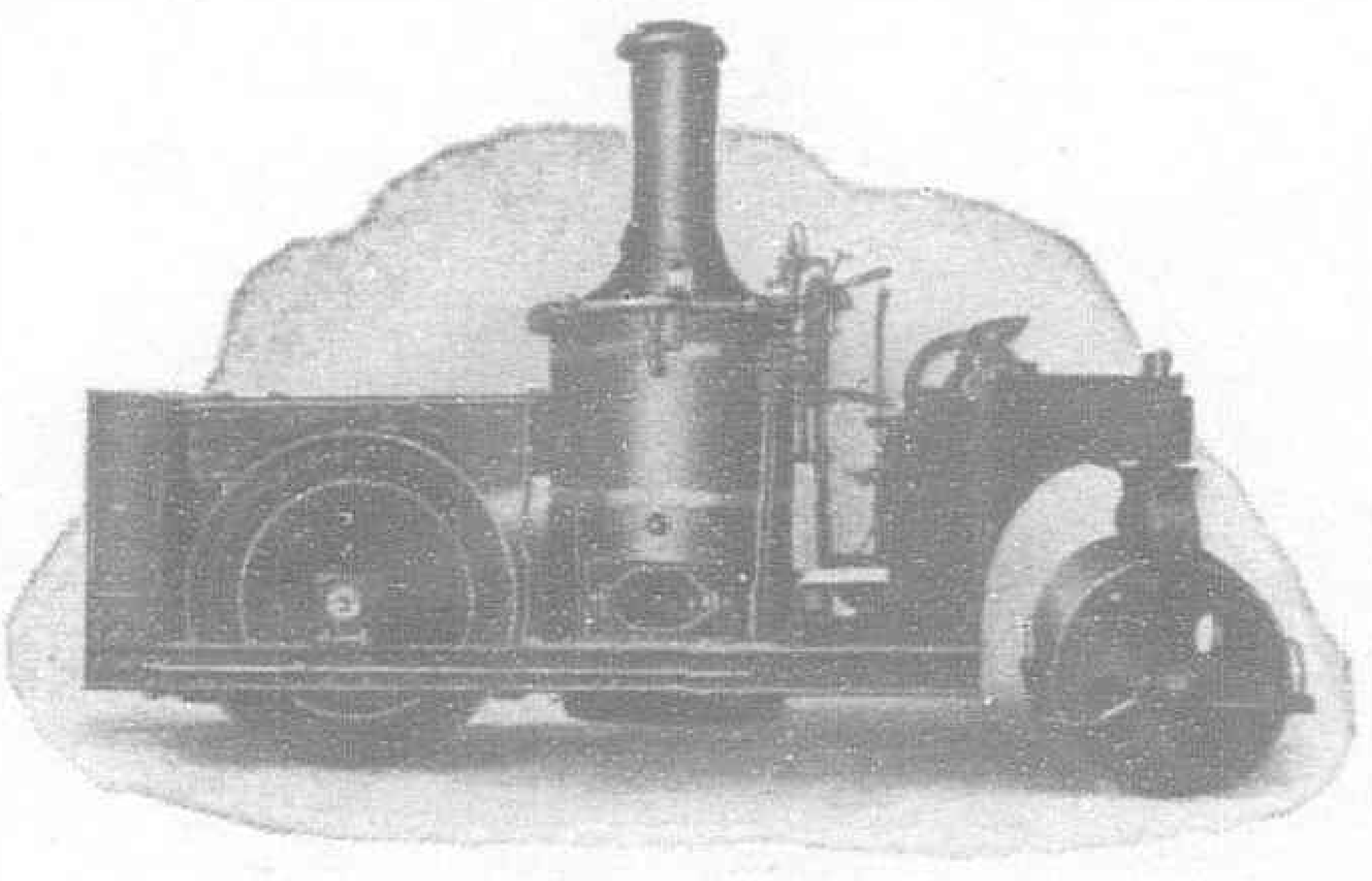

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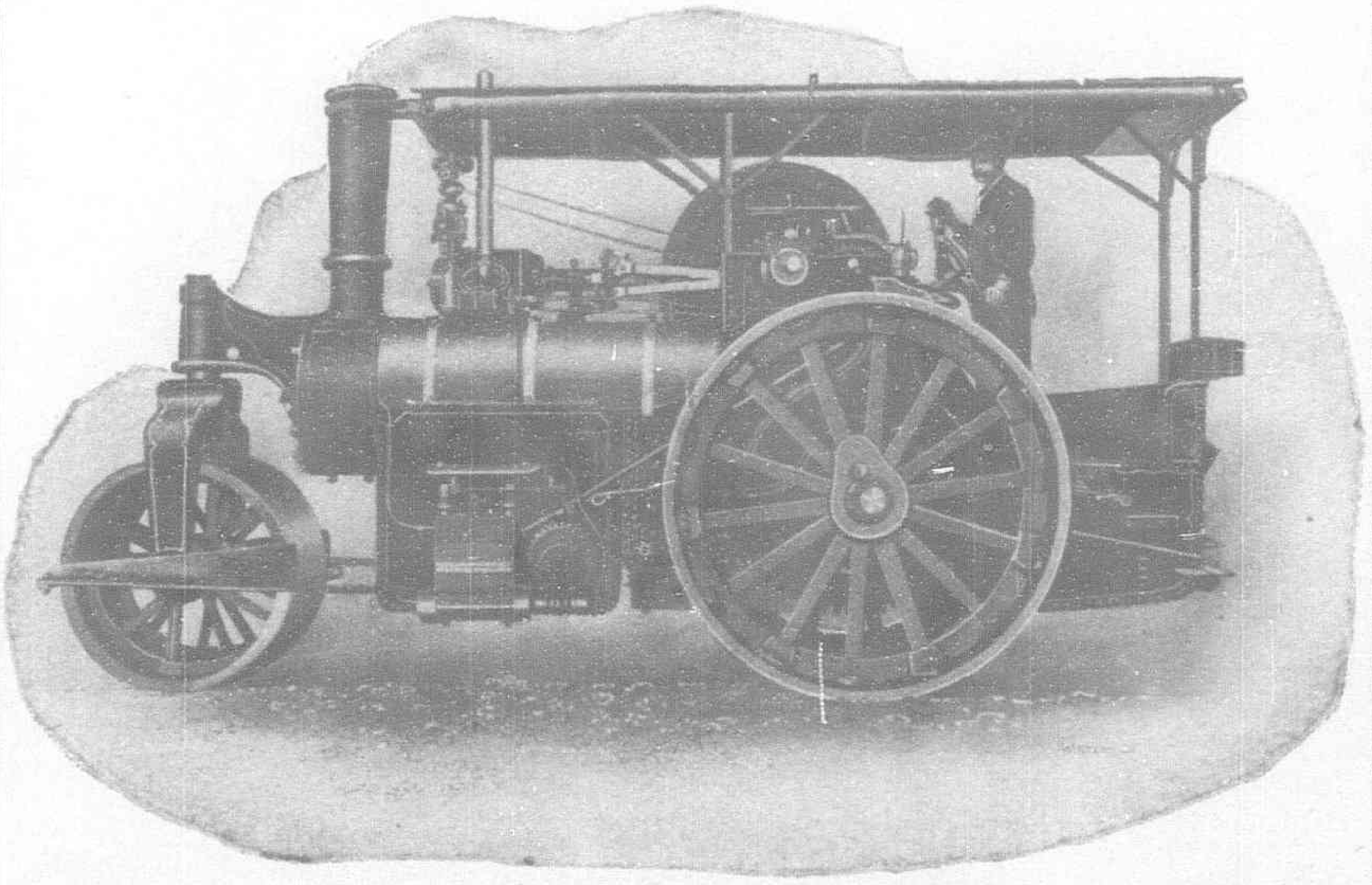

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FAR EASTERN REVIEW

COMMERCE ◆ ENGINEERING ◆ FINANCE

VOL. I. MANILA, P. I., AUGUST 1904. No. 3.

WHANGPOO RIVER IMPROVEMENTS SHANGHAI, CHINA

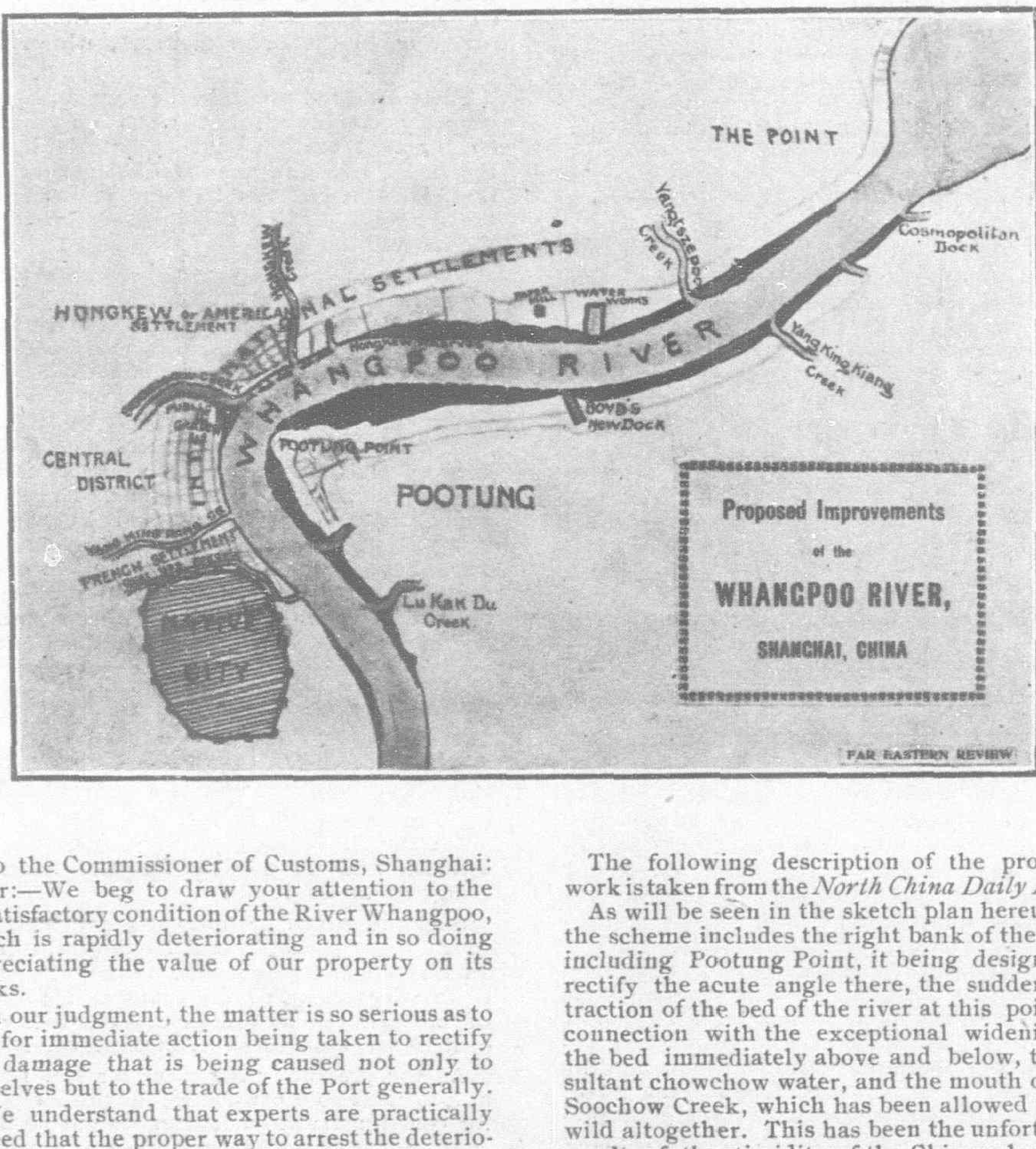
SHANGHAI, CHINA.—The foreign merchants of Shanghai have at last taken the matter of the river improvements into their own hands, or at least have made the preliminary steps in the right direction. The gradual shoaling of the river, and the incidental menace to the great shipping interests of the Far Eastern commercial center, have been the cause of great concern to all having the welfare of the city at heart. The supremacy the city now holds and its continued prosperity depends almost entirely upon its shipping facilities, and any impediment which is allowed to stand in the way of the extension of these interests is bound to retard the natural growth of the city. With the gradual opening up of China, and the great Yangtsze valley, Shanghai is destined to become one of the leading shipping centers of the world, provided the authorities and the commercial houses work in harmony and keep the port improved, so that the largest vessels can enter and discharge with rapidity and economy; on the contrary, the gradual extension of the railways will divert a large amount of traffic to other more favored ports.

The Whangpoo River was credited with being 1800 feet in width, about twenty-five years ago, but it is now only about 1200 feet.

One of the terms of the Indemnity agreement of 1901 imposed upon the Chinese Imperial Government the task of improving the harbors of Shanghai and Tientsin, but so far no active steps have been taken to comply with the obligation. The improvements of the Whangpoo come under the jurisdiction of the Viceroy of Nanking. The work was to be carried out under direction of a joint board of Chinese and Foreign officials, but the former authorities, evidently fearing to allow foreigners to handle such a large amount of money, which could be so much better controlled and expended by the "honest" native Taotais, proposed a new scheme to bring about the desired end.

The Viceroy recently proposed to the Consular Body at Shanghai to appropriate all the money necessary for the prosecution of the work, thus relieving the foreign merchants from any share of the expense, the administration to remain in the hands of the Viceroy and the Imperial Customs authorities. As an offset to the generous and altruistic proposal, he promised to allow the foreigners to name one or two experts to manage the work, and every three months submit the statements of expenditures to the Consular Body for examination. The Imperial Government was not willing to accept any outside aid or contribution for work which should be accomplished by themselves. And so the matter rested, and, the meanwhile, the old Whangpoo gets in its fine work, slowly but surely filling up its bed and widening its banks, to the certain undoing of Shanghai's future prospects.

The new scheme as outlined in the plan grew out of the application of Carlowitz & Co. to construct a new bund on their property at their own expense. The authorities intimated that the request would be favorably considered if all the riparian landowners would join in a like petition. The outcome was the following letter signed by all the firms having water front property, irrespective of nationality, and was seconded and approved by the other leading commercial houses of the city:



To the Commissioner of Customs, Shanghai:

Sir:—We beg to draw your attention to the unsatisfactory condition of the River Whangpoo, which is rapidly deteriorating and in so doing depreciating the value of our property on its banks.

In our judgment, the matter is so serious as to call for immediate action being taken to rectify the damage that is being caused not only to ourselves but to the trade of the Port generally.

We understand that experts are practically agreed that the proper way to arrest the deterioration of the river is by correcting the irregularity of its width and making same increase towards its mouth, in agreement with a certain accepted formula as shown by accompanying plan, and we respectfully urge that this or some similar scheme of conservancy be at once adopted and that owners of river frontages be permitted at their own expense to bund out in front of their respective lots to the line determined on.

For ourselves we agree to bund our properties accordingly and at our own expense directly permission is given, it being understood that title deeds will be granted for all land so reclaimed at the present Shenko price of Tls. 300 per mow, including all expenses, and we have no doubt other riverside owners will be ready to accept such a plan.

In such manner a great portion of the work of conserving the river would be done without the authorities having to raise special funds for the purpose, and thereby one of the objections to the action "Want of Funds" largely removed.

We are, Sir,

Your obedient servants.

The following description of the proposed work is taken from the *North China Daily News:*

As will be seen in the sketch plan hereunder, the scheme includes the right bank of the river, including Pootung Point, it being designed to rectify the acute angle there, the sudden contraction of the bed of the river at this point, in connection with the exceptional widening of the bed immediately above and below, the resultant chowchow water, and the mouth of the Soochow Creek, which has been allowed to run wild altogether. This has been the unfortunate result of the timidity of the Chinese local authorities when they last dug out the bed of the Soochow Creek; they did not continue their operations below the Stone Bridge from a fear of coming into collision with the foreign municipality; and they have been constantly afraid of interfering with the construction by the municipality of a number of antiquated wooden bridges across the Creek, whose multitudinous piles, driven in some cases without regard to the natural flow of the current, have done incalculable injury to the waterway.

The shoaling and silting-up to which the river is subject are due in a great measure to the varying velocity of its current, which in its turn is due to the irregularity in the width. When the river contracts in width and the velocity of the current increases accordingly, it scours out its bed; at Pootung Point, centrifugal forces increase the strength of the current. Great velocity of current and sharp bends lead necessarily to the formation of counter currents and whirlpools, or what is locally known as chowchow water, if the current immediately behind the bend loses force either

(Continued on page 28.)

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MANILA, AUGUST, 1904

Philippine Sugar Industry.—The sugar industry of the Philippines is in a deplorable state, and yet no country in the world offers brighter prospects or more profitable returns to the sugar investor. At present the unjust tariff discrimination operates largely against any great improvement, but there are other causes just as weighty which keep the industry down. It is not altogether the tariff. When trade is dull and prices are low, manufacturers are too prone to seek redress in legislation or tariff tinkering, without first using every endeavor to lower the cost of production by improving their plants and economizing labor.

The Philippine sugar planters are in precisely the same predicament that befell many estates in Cuba, and nearly all of the estates in Porto Rico and the Antilles. Up to ten years ago the ruling prices of sugar were high, and anybody could make enormous profits manufacturing the raw article. Extravagance was the order of the day. A sugar plantation was better than a gold mine, and the planters were the aristocrats of their respective countries. They lived in the gayer capitals of the world, spending their incomes like princes, leaving their properties to be managed by strangers. As long as the immense profits rolled in, they never thought of improving their properties, or installing modern machinery.

And then slowly the conditions changed. The German beet sugar industry came into prominence. Fostered under governmental subsidies, employing the most expert chemists, the latest improved machinery, and with capitalists willing to receive a legitimate return on their investments, they forced the price of sugar down all over the world.

Our island planters refused to heed the "writing on the wall" and continued in their mad extravagance. Lack of administrative ability and antiquated machinery could not compete with modern high class scientific methods, and those who did not invest the remnant of their fortunes in new machinery were soon forced to the wall.

That is the condition in Porto Rico today, and it is exactly what is the matter with the Philippines. Struggling along with a bull-mill and open kettles, turning out muck and mud, which by courtesy is commercially called sugar, but which could not find a market in many refineries in the States, is what many of the planters are engaged in at the present time. At the best, only a few steam mills with open trains, making a muscovado sugar of about 87 degrees of polarization, are working in the Philippines.

Vacuum pans, evaporation in multiple, centrifugals, and, most important of all, defecators, are not known or employed in the islands. It is even stated that on one or two places where pans were installed, they were thrown out at the end of the first crop, the owners reverting to the older methods, which they understood.

There are good profits in the sugar business if properly conducted, but when only about 60 per cent of the juice is extracted from the cane, and half the available sugar realized, it is no wonder that the profits are on the wrong side of the ledger at the end of the crop.

No serious business man nowadays thinks of embarking in a manufacturing undertaking without installing the most efficient up-to-date appliances, yet we see here in the Philippines large sugar interests carried on in the same manner as was employed three or four centuries ago. The deplorable part of it all is, that many sugar properties have capital behind them, controlled by the leading foreign commercial houses of the Islands. These firms know better, or at least should know something about the possibilities of the industry. They have examples all around them of better methods, but they refuse to get out of the rut. Over in the Malay peninsula are several good estates, which, although they can not be classed as strictly modern, are sufficiently progressive in certain parts of their installations. In Java are some of the best sugar houses in the world.

We have passed through a period of depression, and money is scarce, but capital is here in plenty in certain quarters, and an effort should be made to try and better conditions, without waiting for the American Congress to do it all.

Sugar is quoted in Iloilo at $5.00, Mex., per picul of 137½ lbs. This is for the No. 1 grade, which has an average polarization of 87 degrees, or two degrees below the commercial standard of muscavados, and nine degrees below the centrifugal standard and American color limit.

At the present ruling price for No. 1 grade at .016 cents gold per pound, the price received for centrifugals at 96 degrees should be about .02¼ cents, or an advance of about two-thirds of a cent, or $13.33 per ton of 2000 lbs. For an estate making 1000 tons of sugar this means a net advance of $13,333.33⅓ gold. The expenditure of this sum in machinery would place one of the antiquated apologies for a sugar mill on a basis where they would soon be able to invest further capital in bringing their property up to the point where they could secure at least forty per cent more sugar, and lessen the cost of manufacture. What is needed, and needed as bad as tariff revision, is the addition of proper machinery. Defecators, new mills, green bagasse furnaces, multiple evaporators, vacuum pans, centrifugals, and transportation facilities must come, or all the tariff laws in the world can not save the industry from destruction.

Canton-Hankow Railway Concession.—Some time ago the *New York Journal of Commerce* called editorial attention to the international status of the America-China Development Co., stating in effect that a majority of the stock had passed into the hands of a Belgian syndicate, headed by King Leopold, and that the new president of the company was directly instrumental in bringing about the deal, and he was therefore merely a figurehead and puppet for the new controlling interests.

The new president of the Company, in a letter to the Editor, refuted the statements and apparently proved that the majority of the Directors were still American citizens, and the status of the company still remained as before. The *Journal of Commerce* took exception to some of his statements, and reiterated its former assertions, proving that the majority of the Directors were either Belgians, or Americans under their control.

In the light of recent events, it would appear that the *Journal of Commerce* was well within the right in its stand, as the resignation of the Directors of the Company brought the situation out in full.

The whole transaction as now laid bare is far from creditable to American enterprise, and is a body blow at our commercial prestige and influence in China. The concession was awarded to the Americans on the strength of their national policy of upholding the integrity of the Celestial Empire, and as a fender to the ambitions of France and Russia to secure control of the through trunk line to the southern provinces.

And yet the one great point sought for in granting the concession, insuring China against a possible partition or preponderance of Russian influence, has been wantonly lost through the persons in whom she confided the trust. For it is an accepted fact throughout the Far East, that Belgian enterprises headed by King Leopold are in reality Russian in disguise. When we stop to consider that Belgium is not a colonizing power, and in the case of a "show down" could not enforce her claims to a portion of the Celestial pie, this rumor appears very plausible.

That the Chinese government took immediate steps to sound the State Department on its attitude under the new condition of affairs, is sufficient evidence of the great importance they attach to the concession remaining under American control, as a guarantee for the preservation of the Empire.

This brought out the declaration from Secretary Hay that the American government still recognized the Canton-Hankow Railroad as an American institution, and would protect it as such in case of need. It was stated in dispatches from the States, that this stand was taken at the earnest solicitation of the Belgian stockholders, as there was some danger of the property coming into conflict with some other European Powers which are seeking to extend their spheres of influence in China.

The United States government has stepped into the arena, making good the damage caused by the Development Company, and the stand taken by Secretary Hay is a sufficient guarantee that American good faith will be upheld if circumstances should ever call for it.

That the eventuality may occur is conceded by all who have given the matter any consideration. There is nothing to prevent the Belgian interests passing into the hands of France or Russia, and, in these days of stock juggling, it could be accomplished in a comparatively short time—if the deal has not already been consummated.

It is difficult to surmise just what will occur in such a case. It begins to look as though the American government has assumed a great responsibility, which, if not remedied shortly, will eventually involve us in complications with certain European Powers.

The effect of the deal is already being felt, and with it a corresponding decline of American prestige and influence.

The outlook is decidedly bad, and the best that can be hoped for is that opinion in the Far East is mistaken about Belgium's affinity for Russia. If true, then it certainly looks as though our country at a not far distant date will be called upon to make good its recent stand, or lose our commercial influence in China beyond hope of recovery.

CONSTRUCTION AND ENGINEERING NEWS

PERSONAL.

Mr. T. R. Toby has been appointed manager of the Kelantan Gold Dredging Company (No. 1), Ltd., which is an offshoot of the Duff Development Company.

Messrs. Fraser & Chalmers, Ltd., of London, well-known as manufacturers of mining machinery, steam engines, boilers, and machinery for systematic milling, smelting, and concentration of ores, have made arrangements with Messrs. Gilfillan, Wood & Co. to represent them in the Straits Settlements, Malay States, Dutch East Indies, Philippine Islands, and Siam. Mr. G. A Wright, M.I.M.M., who was the original manager of the Redjang Lebong Mine in Sumatra, has been retained as consulting engineer.

We understand that Mr. Willis E. Gray is no longer the general manager of the American Development Company and is not returning to China from New York. Another prominent ex-employee is threatening the powers that be with a lawsuit over his agreement which has been terminated.--*China Gazette*.

Mr. Asada, Commissioner in the Formosan Sugar Refinery Office, and Mr. Yokoyama, an expert in the Formosan Government service, have been appointed to visit North and South America on official business.

The body of Christian Muller, sub-manager of the Rifle Factory at the Hanyang Iron and Steel Works, was found lying in a stagnant pool at Hankow, on the 21st ult. How he came to be in the water there is no evidence to show, but circumstances point very significantly to murder.

The Muar State Engineer, Inche Awang bin Hoosain, S.M.J., has returned to Muar from survey duty in connection with the extension of the Kadana Gold Mining concession at Mount Ophir or Gunong Ledang.

Towkay Loke Yew has contributed a sum of $30,000 towards the establishment of an Engineering School at Kuala Lumpur, to be styled the "Loke Yew Engineering School." Practical lessons will be given at the Government Factory, while theoretical instruction will also be supplied by the Government.

The following Perak appointments are gazetted:—Mr. R. O. N. Anderson, acting State Engineer; Mr. W. A. Wilkinson, acting Engineer in Charge, Krian Irrigation Works.

Mr. I. Ono, manager of the Mitsui Bussan Kaisha at Singapore, has returned to Tokio. He is replaced by Mr. Kamura, who has been in charge at Singapore before.

The name of Mr. T. L. Perkins has been added to the List of Authorized Architects in Hongkong under section 7 of the Public Health and Buildings Ordinance, 1903.

The Hon. R. Shewan has joined the board of directors of the Hongkong and Shanghai Banking Corporation, succeeding Mr. Tomes.

M. Jullidière, chief engineer of Public Works in French Indo-China, is proceeding to India to study British railway systems there, with a view if possible to applying such methods to French Indo-China.

Mr. Tejima, Chief Commissioner of the Temporary Exhibition Bureau, is about to visit America on official business

Mr. Foley, Traffic Manager of the Imperial Railway of North China, has been awarded by his Majesty the Emperor of Japan with the decoration of the Order of the Sacred Treasure.

L. E. Bennett has been appointed superintendent of construction on the harbor improvements at Iloilo, Philippine Islands, the contract for the carrying out of which was recently granted by the Government to J. G. White & Co. Mr. Bennett superintended the work of equipping Bangkok, the capital city of Siam, with an American electric lighting system. He also installed a Yankee plant in the King of Siam's palace. Until recently he was attached to the Government Engineering Bureau in Manila. About $150,000 worth of equipment will be shipped from New York in connection with the work.

Robert B. Stanton has resigned his position with the United Mining & Development Company, No. 66 Broadway, New York, and is about to sail for the Dutch East Indies on a proposition which, it is expected, will mean the purchase of considerable American machinery later on.

Mr. Archibald Little, who left Suifu for Yunnan, Tongking, and England recently with Mrs. Little, is to be congratulated on having obtained a valuable mining concession from the Chinese Government in the Kiangpeh Ting of Chungking province.

HARBOR WORKS

HARBOR WORKS, SINGAPORE.—The work of constructing the immense improvements of the port, recently submitted by Messrs. Coode, Son & Matthews, of London, are to be let out by contract. At a recent meeting of the Legislative Council, the Colonial Secretary submitted a report, in which he stated that it would take at least five months from the time tenders were called for before contracts could be entered into. The complete scheme will require about eight years to complete.

HARBOR WORKS, COLOMBO.—The report of the Chief Resident Engineer on the Colombo harbor works for 1903 gives a full and interesting account of the important operations connected with the great scheme of the improvement of Colombo harbor. The whole of the harbor improvements since 1873, including the two breakwaters, has cost about 31½ million rupees, nearly half of which sum is the cost of the more recent additions, including the Dry Dock (half the cost), Patent Slip, and N.-W. breakwater.

QUAY, SAIGON.—The quay under construction at Saigon will be 1,100 metres long, and nine large vessels will be able to go alongside at the same time.

MADRAS NEW PIER.—The Government of Madras has sanctioned the construction of a low-level pier in Madras Harbor at a cost of one lakh of rupees. The work is being undertaken at the instance of the Madras Chamber of Commerce and the Harbor Trust to reduce the congestion that now frequently occurs in working cargo in Madras Harbor, and is part of a comprehensive scheme for improving the facilities at present existing for working cargo, which comprises the provision of more and larger cranes, a tramway, and electric lighting for night working. In the meantime, the work of extending the harbor is proceeding apace, and the last few months have seen a large number of warehouses and sheds constructed on the foreshore, which is an accretion due to the existence of the harbor.

YOKOHAMA DOCK CO.—It is stated that the Yokohama Dock Company has declared a dividend of 10 per cent. per annum for the present half year, instead of 12 per cent as hitherto This decrease in dividend is due to the slackness of the Company's business during the first half of this year, as most of the Japanese steamers which used to visit Yokohama are now plying in the western parts of the country.

CANTON IMPROVEMENTS, THE BUND.—The construction of the bund continues very slowly. For a while the work has pushed forward vigorously. Now days pass without apparent progress being made. The very high tides have interfered with the work. The building of the Custom House is also going forward slowly. It is quite evident that their public work is not to be "rushed" to completion.

RECLAMATION WORK IN KOREA.—Seoul, June 24th.—The Korean Court, while thinking that it is very desirable that the waste ground in Korea should be reclaimed, is not inclined to grant the right of doing the work to foreigners.

Many petitions have been presented to the Emperor, urging that the work should be placed in the hands of Koreans.

HARBOR OFFICE, NAGASAKI —Work on the construction of the Harbor Office building at Deshima is progressing satisfactorily. It is expected to be completed early next month, and the office will remove to the new structure on or about the 20th of August. It is reported that the authorities have arranged to construct another building on the lot adjacent to that of the harbor office, for the harbor police.

PEIHO RIVER IMPROVEMENTS.—The opening of the third cutting of the Peiho, near Tientsin, on the 11th, was a practical and spectacular success. It is 11,000 feet long, and it shortens the course of the river 4½ miles, the same distance having been saved by the two previous cuttings. Its cost was Tls. 300,000.

ELECTRIC RAILWAYS

SHANGHAI TRAMWAYS.—At a meeting of the Shanghai Municipal Council held on Wednesday, 22nd of June, 1904, a report by the Electrical Engineer was read, stating the circumstances under which Messrs. Preece and Cardow have embodied, in the conditions for Tramway tenders in London, a clause to the effect that the purchase of power from the Council is compulsory. The Secretary was directed to telegraph to the London Agents, instructing them that this clause must be withdrawn, since it has been decided that the purchase from the Municipal Supply or the establishment of a separate Power House shall be at the option of the firm or company tendering.

ELECTRIC LIGHT AND POWER AT TIENTSIN.—Peking, June 18.—A few days ago, a contract as to the electric trams and electric light in the town of Tientsin was signed between a Belgian syndicate and the Governor of Tientsin, the sum of 50,000 taels being presented to the Viceroy. The Belgian Government has decorated the Governor and others who have been concerned in the matter.

BANGKOK TRAMWAYS.—The Siamese Government is inviting tenders for the supply of tramway material. Particulars have been sent to Barr, Thomson & Co., of Kilmarnock, Scotland.

ELECTRICAL POWER FOR MADRAS—Madras, June 17.—Major A. W. deLotbiniere, R. E., has arrived in Madras after completing a tour through the principal industrial centres in South India with a view to discuss on the spot with the manufacturers the question of the substitution of electrical power derived from Periyar for the existing steam power. It is 11 years since a special committee of experts was appointed to inquire into the question of utilizing the immense water power available at Periyar. That committee reported that there was no doubt as to the practicability of turning the water power to good account, and estimated that, after making due allowance for interest on the first cost and depreciation of plant, the power could be delivered at Madras at an annual cost, per horse power, of £3 and £2 at

Madura and £1-10 at Trichinopoly, while manufacturers would benefit enormously by the reduction in the cost of production. The special committee pointed out that the development and utilization of this electrical power at Periyar would be of the greatest importance to the Government from a financial point of view. The report of Major deLotbiniere is now awaited with the greatest interest.

ELECTRICITY FOR BANGALORE.—Bangalore, June 18.—The Mysore Government has just sanctioned an estimate amounting to six lakhs of rupees, as prepared by Major deLotbiniere, for developing electric power at Sivasamudram to provide both power and light to Bangalore city and cantonment. The scheme, which has been worked out in detail by Mr. Gibbs, Chief Electrical Engineer, Mysore, provides, among other things, for a separate transmission line from Sivasamudram to Bangalore capable of carrying 1,000 horse power, the necessary lines throughout the city and cantonment for carrying current for street lighting, three systems for distributing, power transformers for houses, and a separate system for carrying currents for private lighting. The machinery for generating the required power is now being installed, and part of the second installation is in course of erection at Cauvery Falls. The Gold Companies at Kolat also require extra 2,500 horse power. Government has therefore decided to put up generators capable of delivering 5,000 horse power. The whole installation will cost approximately £80,000.

TOKIO ELECTRIC CAR CO.—A general meeting of the shareholders of the Tokio Electric Car Company was held a few weeks ago, when the question of increasing the Company's capital, recently reported in these columns, was discussed, the motion being finally adopted. The following balance sheet for the last half-yearly period, extending from December to May, was also passed on the occasion:—

	Yen.
Gross receipts	728,029
" expenditure	401,182
Net profit	326,847
Brought over from previous accounts	661
Total	327,508
Reserves (including interest)	41,323
Dividend (7% per annum)	150,937
Royalty to the city	20,883
Rewards to officers	25,000
Bonus to shareholders (4% per annum)	86,250
Carried forward...	3,115

The following table shows the number of passengers carried on the Company's line and the receipts therefrom, and as the line was converted from a tramway into an electric railway by March 17, the figures are classified accordingly:

ELECTRIC RAILWAY.	
Number of passengers	19,790,000
	Yen.
Receipts...	593,000
Average daily receipts	3,244
TRAMWAY.	
No. of passengers	3,459,000
	Yen.
Receipts	86,000
Average daily receipts	800

It will be seen that the Company's daily receipts since the inauguration of the electric service are four times as much as in the days of the tramway service. In conclusion, it may be added that, since the opening of the new service till May 31, the Company has consumed 2,442,000 kilowatts of electric power, or a daily average of 13,000 kilowatts.—*Japan Times.*

TRUCKS, MANILA TRAMWAYS.—The Peckham Manufacturing Company, of Kingston, N. Y., has secured a contract for 55 trucks for the Manila electric traction system. A Belgian concern, La Métallurgique, of Brussels, will build the cars, which will be made of teakwood, in order to withstand the ravages of the white ant.

TOKIO TRAMWAYS.—Work has begun, and is actively pushed, on the second tram system in Tokio. The section from the gate near the British Legation to Aoyama, past the Aoyama Palace, and that connecting Aoyama and Shiba, will probably be finished before October.

NEW ELECTRIC RAILWAY, OSAKA, JAPAN.—Advices from Osaka, dated the 23rd ult., say that the Osaka city authorities propose to construct an electric railway from Hanazono Bridge to Suyeyoshi Bridge via Nagabori, and another from Umeda Station to Tennoji and Namba, a total length of eight miles, at an estimated cost of 3,600,000 *yen.* This proposal was recently introduced at the City Council for approval, but owing to a difference of opinion among the aldermen, no decision was arrived at. In the meantime, it is reported that Mr. Soichiro Asano, of the Tokyo Kisen Kaisha, contemplates the construction of an electric railway in Osaka, the news of which has caused great consternation among the City Council. It is believed, however, that under these circumstances the necessary official permission will not be granted to Mr. Asano. There is an electric railway service running from Hanazono Bridge to the harbor, a distance of four miles, which was opened in the spring of last year, the daily average receipts of which amount to 120 *yen*, or an increase of 20 *yen* above the estimated returns.

BANGKOK TRAMWAYS.—Messrs. Dick, Kerr & Co., Ltd., who are the contractors for the tramways in Singapore and Hongkong, have just secured the contract for the Siamese Tramways Co.'s line.

THE TOKIO STREET RAILWAY COMPANY has ordered through the New York branch of Mitsui & Co., at 445 Broome street, four 1,500-kilowatt Curtis turbines, to be built by the General Electric Company, 44 Broad street, for installation in the central power station of the company. The existing section of the system is operated by power generated by the Tokio Electric Light Company. Two 500-kilowatt Curtis turbines were also ordered recently for the Tokio Street Railway plant. Over 30 miles of double track will be operated before the ultimate completion of the lines.

J. G. WHITE & CO.; NEW CONTRACT.—The engineering and contracting firm of J. G. White & Company, Limited, the British correspondents of J. G. White & Company, New York, has secured a contract from the Urban District Council of Dartford, located about fifteen miles from London for the construction and leasing of 8½ miles of electric traction system. In the first instance 12 cars will be employed. The Council will, under the agreement, seek parliamentary powers for extending the system to Swanscombe—a town about five miles distant. J. G. White & Company will also construct and lease this line. The same concern is now executing electric tramway construction and equipment work in and around London, for the London Council which will entail an expenditure of fully $3,000,000. A large portion of the material, equipment, etc., will be of American manufacture.

ADELAIDE TRAMWAYS.—The South Australian Government has notified the Adelaide & Southern Tramways Company, which operates some 23 miles of horse lines, that its system is required to be electrically converted, and that £214,000 is the price which the company will receive for its lines. The Australian electrical engineering and contracting firm of Noyes Bros., who represent the Australian interests of the Westinghouse and Brill companies, are figuring on the contract for the electrical equipment.

MANILA ELECTRIC STREET RAILWAY.—The Babcock & Wilcox Co. has been awarded the contract for the boilers to be installed in a power-house, which is to develop energy to operate the forty odd miles of electric traction system now being hastened to completion by J. G. White & Co. at Manila, Philippine Islands. There will be six boilers of 400 horse-power each, or 2,400 horse-power in all. The electrical apparatus will be of Westinghouse build.

The United States Steel Products Export Co., which concern handles the foreign business of the United States Steel Corporation, has secured the contract through the electrical engineering and contracting firm of J. G. White & Co., 49 Exchange place, for the steel to be used in the construction of the car-barn and shops for the extensive electric traction system now being built in Manila, Philippine Islands.

CAUVERY FALLS TRANSMISSION.—The Mysore Government, India, has placed contracts with the General Electric Company for five large electric generators for the Cauvery Falls generating station, which furnishes power for transmission to the Kolar gold fields.

TOKIO STREET RAILWAY.—Eight hundred motor equipments have been ordered from the General Electric Company, of No. 44 Broad street, for use on the cars to be employed on the Tokio Street Railway Company's forty odd mile electric traction system now under construction at Tokio, Japan. The power station, which will be the largest electric generating plant in the Far East, will have a capacity of not less than 7,000 kilowatts. The equipment will comprise four Curtis' turbines of 1,500 kilowatts capacity each and two of 500 kilowatts each.—*N. Y. Journal of Commerce.*

SEOUL ELECTRIC TRAMWAY.—Difficulties which arose some time ago between the Seoul Electric Tramway Company and the Emperor of Korea relative to the mortgage on the electric road appear to have been settled by a new arrangement, whereby the Emperor is to pay -Y-750,000, and the two parties to assume equal partnership in the business.

HANJIN ELECTRIC RY. CO.—The Hanjin Electric Railway Company has just issued to the public 8 per cent debentures to the amount of -Y-525,000. As the subscription list was closed yesterday, the result of the issue is not yet known. A Tokio bank, the Third, guarantees the principal and interest of the debentures, which are to be redeemed in ten years —-Y-52,500 annually—at the discretion of the company after the lapse of five years. This is the third debenture issue of the Hanjin Company, the first and second issues, amounting to -Y-975,000, being unredeemed. The capital of the company, -Y-1,500,000, is now all paid up. This company is now in course of constructing an electric line between Kobe and Osaka.

YOKOHAMA ELECTRIC RY.—The Kanagawa-Yokohama section of the Yokohama Electric Railway Company will be opened to traffic shortly. The fare on the section is fixed at three sen per person, but a reduction of one sen is to be allowed in the case of coolies and other classes of workmen, this privilege being only in force from 5 to 6 a. m. and from 5 to 6 p. m. each day. The above rates have been sanctioned by the proper authorities.

TRAMWAYS, AUCKLAND, N. Z.—The Auckland Tramways Company, now controlled by the British Electric Traction Company, and which operates the electric traction system in Auckland, New Zealand, is to extend its power house. Further American machinery will be installed. The capacity of the plant will be increased from 1,500 horse-power to 2,500 horse-power. The existing equipment is largely of American manufacture. The line was built by the London interests of the electrical engineering and contracting firm of J. G. White & Company. Twelve additional cars will also be employed on the system.—*N. Y. Ex.*

TRAMWAYS, PENANG.—It is reported that the Georgetown municipal authorities have acquired the Prince of Wales Island tramways, operated at present as a horse line, and are to convert the system into electric traction at an estimated cost of $400,000. Bagnall & Hilles, the American electrical engineering and contracting firm, whose headquarters are in Yokohama, with branch in Singapore, are understood to be figuring on the contracts for equipment, etc.

ELECTRIC LIGHTING, ETC.

Penang Electric Light.—The electric lighting installation at Penang is practically complete. The plant has already been tested and found satisfactory. No public inauguration will be made, however, until the works are thoroughly in order.

Electric Lighting on the C. G. R., Ceylon.—Colombo, June 26.—Stone's system of electric lighting on the Railway, which was introduced into the island by the Railway authorities, is being tested still. The Governor's saloon has been fitted up with it, and the results have been satisfactory, and the light exceedingly good. Before anything definite is decided as to its adoption on the Railway, further trial is required.

Electric Light, Macao Hotel, Macao, China.—There has been a move towards modernity in the practically mediæval city of Macao. Electricity has at last found its way to that place of oil lamps. It is at the Macao Hotel that electricity has been installed, which is further evidence of the enterprise of its proprietor, Mr. W. Farmer. This initial electrical plant has, one is pleased to learn, been fitted up entirely by a British firm with British materials. Messrs. Dodwell & Company undertook the work. The engine is a Hornsby-Akroyd (by R. Hornsby & Sons, Ltd., of Grantham), and the dynamo is by the General Electric Company, of London. Mr. Price, of Hongkong, attended to the wiring arrangements, and the whole of the work was under the superintendence of Mr. T. Skinner, of Messrs. Dodwell & Co., who has cause to be proud of the way in which the work has been carried out. Messrs. Dodwell & Co. supplied all the materials. The engine is a 12½ brake h.p. oil engine, the name of the maker being sufficient to guarantee its efficiency. This type of oil engine challenges comparison for its simplicity of working, economy and good results. It may be here mentioned that these engines are much used by British and Foreign Governments. They are especially adapted for work in connection with search and projector lights in forts, etc. They are in use for such purposes at Stonecutters and at the Lyeemun forts. The engine at Macao has been running during the past week and has given every satisfaction.

The new illuminant is quite an asset for the hotel. The obsolete oil lamps no longer unbearably heat the rooms or create stuffy odors; the light is now worthy the name of light. Electricity is also to be used for other purposes. Stops have been fitted in the hotel rooms for fans and portable reading-lamps, and there is a thorough up-to-date atmosphere in the Hotel. The despatch with which Messrs. Dodwell & Co. executed the order may be understood when it is known that in three months after giving the order, the hotel was enjoying the advantages of electric light.—*S. C. Morning Post.*

Electricity at Dalny.—At the present moment, says the *Electrical Magazine*, when the eyes of the world are centred on the Far East, it may be of interest to note that Dalny was one of the most progressive communities as regards the application of electricity to public and private requirements. The central station, completed about twelve months ago, had a total capacity of 3,000 horse-power, with space for additional machinery of the same output. In addition to public and private lighting, electricity was applied for pumping the dry docks and for driving machine, boiler, and other workshops in the harbor. The town also possessed an admirable telephone system.

Electric Lighting, Colombo, Ceylon.—An improved incandescent gas lighting scheme is now nearing completion at Colombo. There will then be some 500 new lamps, bringing the total number of lamps in the city to about 2,300. The new piping laid down will be about 18 miles long, bringing the total length of piping to about 90 miles.

The Cauvery Power Transmission Scheme, India, is expected to yield in the ensuing official year a sum of fifteen lakhs as revenue; but will consume close upon twelve lakhs, if not more, leaving a probable balance of about three lakhs.

Electric Fire Alarm System, Hongkong.—At a recent meeting of the Legislative Council at Hongkong, the Colonial Secretary, responding to a query made by the Hon. R. Shewan, stated that the question of installing a modern electric fire alarm system was under consideration by the Government.

Experiments have already been made with telephonic fire alarms. The results have been very discouraging, the native population never having been known to use them. Under the present system look-outs are kept for the purpose of giving alarm, and the police on duty in the street make free use of Government and private telephones for the purpose.

Telephones, Bangkok.—A petition is now going around amongst the prominent business firms of Bangkok for signature, asking that the Siamese Government take steps to restore telephonic communication with Koh-si-Chang with as little delay as possible, pending the construction of the promised instalment of wireless telegraphy.

Long Distance Telephone in North China.—It is reported that, with a view to establishing a telephone line connecting Peking, Tientsin, Petang, and Taku, Viceroy Yuen of Chihli has authorized his Japanese adviser, Mr. Yoshida, and the superintendents of the Peking and Tientsin Telegraph Offices to carry out the necessary investigations for the purpose. On the realization of this scheme, the Viceroy will probably take steps to acquire the telephone line between Peking and Tientsin, which is conducted by a Danish subject and is doing quite a prosperous business.

Wireless Telegraphy—Shanghai, June 13th.—A certain company here has supplied some telegraphic apparatus of the Marconi type to the Russian Consulate at Chefoo.

The New German-Dutch Cable.—The *Java Bode* says that the German-Dutch cable company, for laying connecting lines between Menado in Celebes and the Caroline Islands and Guam; and, from Guam to Shanghai, by way of the Pellew Islands, has at last been floated. The German and Netherlands Governments have signed a convention to carry out the scheme. In Holland, it is reckoned to be of great importance that, through this convention, the Netherlands, in time of war, will no longer depend upon a British company—the E. E. and A. Co.—for cable communication with the Dutch Far East Colonies. Holland will soon be able through this arrangement to utilize the American Pacific Cable. The French Government sees this, too, and has agreed to connect with the new cable from Saigon. The German-Dutch Company, which probably will be domiciled at Cologne, has established itself for a term of forty years, under official supervision, and will be highly subsidized by both Governments. The subsidies will diminish to keep pace with expected increase in the receipts. Some of the conditions are, however, kept secret.

Telephones, Shanghai.—Gustav L. Oberg, general manager and secretary of the Shanghai Mutual Telephone Company of Shanghai, China, is now in the U. S. en route for Sweden, his home. The system is to be extended and a substantial contract for equipment is expected to be placed as a result of Mr. Oberg's visit.—*N. Y. J. of C.*

Telephones, Manila.—La Sociedad de los Telefonos de Manila (Manila Telephone Company) has applied for a new franchise, and it is said that, if secured, the company will be reorganized under American management and its system considerably extended and modernized, which will mean the placing of several interesting orders in the States.—*N. Y. J. of C.*

The Albert & J. M. Anderson Manufacturing Company, of Brookline, Mass., has secured a large Manila contract for its specialties.

Electric Light and Power, Australia.—The Australasian electrical engineering and contracting firm of Noyes Brothers, acting on behalf of the Westinghouse interests, has secured a contract for the installation of an electrical plant for Wallaroo and Moonta mines. The equipment will be of polyphese type. The Noyes people are after the important contract for the electric lighting plant at New Castle, N. S. W.—*N. Y. J. of C.*

Telephones, Manila.—The Western Electric Co., of New York, have been allotted the contract for the telephone system to be used for dispatching the cars in the Manila electric traction system.

Telephones, Nagasaki.—The telephone service for the exclusive use of the police authorities between Nagasaki and Sasebo has just been opened from Sasebo to Haiki, and from Nagasaki to Omura. The Haiki-Omura section is expected to be ready for service in a few days.

Telephones, Peking.—The Chinese authorities are trying to induce the foreign syndicate to remove its Peking-Tientsin telephones, on the ground of the Government's intention to institute a system of its own.

Electric Light, Kuala Lumpur.—We hear that Messrs. Callender's Cable and Construction Co., Ltd., who laid the cables for the Penang electric lighting scheme, have obtained the contract for the laying of the cables for the Kuala Lumpur electric installation.

WATER WORKS, DRAINAGE, ETC.

Canal, Hunan, China.—A Ch'angsha, capital of Hunan, dispatch states that Chu Ch'i-yi, prefect of Ch'angtêfu in that province, has suddenly become very unpopular with the people of his prefecture on account of his progressive ideas. It seems that, upon investigation, the prefect found that by digging a canal to connect his city with Tungting lake it would greatly facilitate communications with other places, and also add to the trade of Ch'angtê prefecture, and so, with this laudable object in view, he gave orders to survey a route for the proposed canal. But the people of Ch'angtê prefecture, blind to their own future interests, would have none of it, on the ground that it would cut up the country and lessen the area of the rice-producing region of the neighboring prefectures. Measures have now, it is stated, been taken by those interested in that part of Hunan province to prevent any attempt to cut such a canal, and for this purpose no less than 10,000 persons have been enrolled to resist the innovation. As this has a savor of armed rebellion against the constituted authorities, the provincial government may have to take the matter up.—*N. China Herald.*

Simla Water Supply.—Simla, June 16.—The small committee which will shortly sit and consider the question of still further improving the water supply of Simla will probably include as members Mr. Ducane Smithe, Chief Engineer of the Punjab Government, and General Beresford Lovett, who have both made a careful study of the subject.

Waterworks, Canton, China.—It is now under consideration to adopt an up-to-date water supply for Canton, and introduce a proper system of sanitation. These schemes will require an enormous supply of large pipes, more especially in connection with the supply of water, which will have to be conveyed for a distance of over ten miles. I have already had an interview with the engineer on the matter, and gathered that the pipes to be adopted may be about 24 inches internal diameter, and cast iron or steel. It is therefore advisable to send me quotations f. o. b. for all sizes of pipes from 10 inches up to 24 inches diameter. I will then have a further interview with the engineer, with a view of the introduction of New South Wales pipes. Please also include 3, 4, and 6 inch reticulation pipes, as well as 1, 1½, and 2 inch galvanized water pipes for house connections, etc. It may be some little time before the work is put in hand, but there is nothing like being prepared with the necessary information beforehand.—*From Report of Mr. J. B. Sutter, Australian Commercial Agent.*

Water Supply and Sanitary System, Bangkok.—The canals and creeks of Bangkok are to-day in such a silted up condition that most of them are quite useless as waterways and means of communication. On the contrary, the constantly accumulating filth and stagnant water which they retain render them hotbeds, breeding all sorts of noxious germs and pestilential odors. Instead of being most potent agents of spreading disease, these waterways, if kept deep and clear, would be a powerful means of warding off the numerous scourges, in the shape of epidemics, that visit this city periodically, and decimate the population. The population of Bangkok is rapidly growing, which is another reason why the authorities should bestir themselves in undertaking and pushing forward these vital works. Though, as far as we know, nothing like a reliable census is kept in Siam, still we would be inclined to put the figure of Bangkok inhabitants at a much higher figure than 600,000, and therefore the obligation of the authorities to procure wholesome water and a sanitary system for their city increases in proportion. We hope, however, that among the many and urgent public works which will have to be taken up in the immediate future, involving immense sums of money, a water-supply and an adequate system of sanitation for Bangkok will take an important place, and, if there should happen to be a question of preference, that these vital schemes will head the list in the programme.—*Siam F. Press.*

Drainage Works, Colombo, June 26.—Satisfactory progress is being made in connection with the great drainage scheme of Colombo. The work of pipe-laying, which was commenced on Lotus Road a few weeks ago, has been done for a considerable distance. A new section was commenced a few days ago at 2nd Cross Street, Pettah, and will be carried from here through the various cross roads in that part of the town.

Drainage, Hongkong.—The Sanitary Surveyor's report for the second quarter of 1904 is to hand. We make the following extracts:—

"Plans were passed for the drainage of 47 houses. Plans for 211 houses were carried forward from 1903, and of 104 houses from the first quarter of this year. This makes a total of 362 jobs in hand. The drainage of 90 houses, however, has been completed and 28 were cancelled during the year, leaving 244 to carry forward. Notices for repairs or alterations to the drains of 78 houses have been received during the quarter. Fifty-eight were carried forward from 1903, and 26 from the first quarter of 1904, making a total of 182 in hand during the year. Of these 54 have been completed and three cancelled, leaving 125 to carry forward. The drains of 106 buildings have been inspected and reported on as defective. Of this number 48 required reconstructing and 58 amending. Houses to the number of 3,927 have been inspected by Drainage Inspectors, with the result that 368 drainage nuisances have been discovered."

Theater, Hanoi.—The Municipality of Hanoi has recently benefited to the extent of $90,000, being the balance of a loan of $100,000 advanced by the Government to the Municipality for the construction of the new theatre at Hanoi. The Government has decided not to ask for repayment of such balance.

Water Supply, Rangoon.—The supply mains for the Hlawga Waterworks have just arrived at Rangoon. Hlawga is a village about 15 miles from the city of Rangoon, where a large surface tank is now under course of construction, and from which the water is to be pumped into town through large cast iron pipes.

SHIPBUILDING

New Steamer, Osaka.—The "Gishu-maru," one of two steamers which are now being built at the Osaka Ironworks to order of the Osaka Shosen Kaisha, was recently launched at the Sakurajima Yard. The steamer is built of steel, and is 180 feet long, 28 feet wide, and 19 feet deep, with a contract speed of 12 knots. The passenger accommodations will be 10 cabin, 35 second-class, and 253 steerage. The sister-ship "Anto-Maru" will be launched about the middle of next month.

New Launch, Chefoo.—The new steam launch "Meifoo" for the Standard Oil Co. has arrived at Chefoo. The Company's interests at this port are increasing in such a way as to necessitate a boat for towing purposes. The launch made the trip under her own steam from Hongkong, where she was built.

LAUNCH OF THE S.S. SHANGHAI

The biggest vessel that has been built in Hongkong was launched at Kowloon on July 14. The vessel is the s.s. "Shanghai," built by the Hongkong and Whampoa Dock Company for Messrs. Butterfield & Swire, Agents of the China Navigation Co., Ltd. The launching ceremony was performed by Lady Goodman.

The length of the steamer between perpendiculars is 310ft.; breadth, moulded, 46ft.; depth, moulded, 14ft. 3in. She has a double cellular bottom, and a dead-weight capacity of about 1,900 tons on a draught of 11ft. 9in. Two sets of triple expansion surface condensing engines are fitted, the diameter of cylinders being 14½in., 24in., and 39½in. respectively, while the length of stroke is 30in. There are two single-ended boilers of mild steel; mean diameter, 15ft.; length, 11ft. 6in.; working pressure, 190lbs. She is supplied with both steam and hand reversing gear. The speed of the "Shanghai" will be 11½ knots per hour, fully laden. She is lighted throughout by electricity.

The "Shanghai" is intended for traffic on the Yangtsze River, and deprives the "Kinshan" (on the Hongkong-Canton run) of the honor of being the largest vessel built in Hongkong. The latter vessel was built about two years ago. The passenger accommodation on the "Shanghai" is to be of the best. The saloon is to be neatly fitted in yellow pine painted enamel white, with gilt edge mouldings. The ceiling is to be white, relieved with gold, and the saloon will be completed with mahogany furniture. There are to be ten passenger cabins, nine fitted with two berths and one fitted with one berth, the berths to have wire spring mattresses, each stateroom to be fitted with electric fans, patent folding lavatories with mirrors, sofas upholstered in Morocco leather, and linoleum floors and strips of Brussels carpet. The first class Chinese passenger accommodation is below deck, also fitted with electric fans. There are three full decks, main, saloon, and promenade. The "Shanghai" is a double-bottom steamer, carrying water ballast right fore and aft.

Amongst those who have been prominently concerned in the building of the vessel are:—Mr. Kerr, superintendent, and Mr. Smith, foreman wood shipwright; Mr. Graham, superintendent; Mr. Russell, foreman iron shipwright; and Mr. Ewing, foreman joiner.

Fukagawa Shipbuilding Co., Japan.—The Okawa Transportation Company of Saga Prefecture, which is maintaining a steamship service between Karatsu and Fusan, has planned the extension of the line to Chin-nam-pho via Mok-pho and Chemulpho, and with this end in view some time ago placed an order with the Fukagawa Ship-building Yard at Wakatsu, for the construction of a steamer of some 700 tons. The new steamer is to be named the *Fukagawa No. 1*, and will be launched about the middle of July. In addition, the company has decided to open a service between Karatsu and Osaka, via Hakata and Moji, by the *Kinshu Maru*, a steamer of some 450 tons.

Shipbuilding, Borneo.—The North Borneo Trading Co. have turned out, in addition to sundry lighters, the steam launch *W. B. Pryer*, the steam schooner *A. J. Scrutton*, the pearling schooner *America*, and now the *W. E. Roberts*, whose principal particulars are as follows:—Length 126 feet, overall 133 feet; breadth moulded, 28 feet; depth moulded, 12 feet. Built of wood, she will be rigged as a two masted steam schooner, with sails, for carrying timber, for which she has a capacity of nearly 22,000 cubic feet. Her deck machinery will consist of a steam windlass, and a hand steering gear will also be fitted.

BUILDINGS

New Lighthouse, Formosa Channel.—The new lighthouse on Tungyung Island has been completed, and was exhibited for the first time at sunset on the 1st instant.

The station has been built on the eastern side of the island, and the centre of the light is 325 feet above high water, giving a range of at least 25 nautical miles.

The slope of the eastern side of the island is exceedingly steep, and the site presented considerable difficulties in consequence, the various buildings being erected on a series of terraces benched out of the rock.

The optical apparatus, which was constructed by Messrs. Barbier, Benard & Turenne, of Paris, is of the first order, and is revolved on mercury, showing three flashes in rapid succession every twenty seconds. The illuminant is an incandescent mantle heated by petroleum vapor on a system recently introduced into European lighthouses, and the mantle is of the largest size, 82 millimetres, yet constructed.

This new system of illumination is vastly superior to the old six-wick burner and produces twice the power with a smaller consumption of oil. The intensity of each flash is estimated at no less than 500,000 candle-power—a considerable advance on the fine hyper-radial light on Peiyushan.

The tower and lightkeepers' dwellings are of brick set in cement with stone facings, and the station is a very complete one, having separate houses for foreign and native staffs, storehouses, hen houses and pigsties, a landing hut, a powder magazine, and numerous fresh-water cisterns of large capacity. The fogsignalling will be done by two 18-pounder cannon placed on a platform below the lighthouse.

The designs were prepared in the Customs Engineer's Office in Shanghai, and the work has been carried out under the direction of Mr. J. R. Harding, Mem. Inst. C. E., Engineer-in-Chief, and under the personal supervision as Resident Engineer of Mr. D. C. Dick, Asso. Mem. Inst. C. E., Assistant Engineer.

Foochow was the local base of operations, and the work has been under the control of Mr. E. B. Drew, Commissioner of Customs for that port.

The Green Island Light, Hongkong.—A sum of $9300 has been appropriated by the government for carrying out the work of improving the Green Island Light:—

New Tower	$5,439.47
Additional Quarters	2,479.98
Shifting Light from Cape D'Aguilar to Green Island	500.00
Contingencies	880.55
Total	$9,300.00

The D. P. W. said the work would be commenced this year.

Hotel de L'Europe, Singapore.—There is now on view at the Hotel de l'Europe an elevation plan of the new Hotel buildings, which are shortly to be commenced. The accommodation will be sufficient to meet all frequenters of first class hotels, and, amongst the many requirements of a building of three stories which the new Hotel is to be, are elevators which the proprietors have provided for, together with electric light and fans and all the most modern conveniences. When all is finished it will bid fair to be the most magnificent Hotel in the East. The building will probably cost $400,000, and Messrs. Swan & Maclaren are the architects entrusted with the work.

NEW HOSPITAL, MANILA.—The board of health has approved the plans for a building for a civil hospital on the grounds on Calle Padre Faura.

The plans provide for a magnificent hospital on the most modern lines, containing offices, operating rooms, extensive wards for men and for women, wards for the insane, detention wards, a medical school, morgue, quarters for nurses and employees, a residence for the superintendent, kitchens, and necessary outbuildings.

There will be four large amphitheatres for medical students' clinics, and provisions are made for the use of the X rays and all of the latest scientific aids to surgery and medicine.

An entire department for a maternity hospital with different wards and another for a woman's hospital. There will also be two large free wards.

The stables, kitchens, and other outbuildings will be most complete and modern. Altogether the plans provide for the finest modern hospital in the Orient.

ROADS

OIL FOR ROADS, BOMBAY.—At a recent meeting of the Standing Committee of the Bombay Corporation the question of oiling the roads to keep down the dust nuisance was again discussed. Experiments have already been tried and proved satisfactory, and the Executive Engineer has been instructed to prepare estimates for carrying out further tests. This has been done, and the estimated cost is Rs. 11,000 for tarring and oiling some of the principal thoroughfares. The Standing Committee has adopted the Executive Engineer's estimate, and forwarded it with their recommendation to the Corporation.

General Kuropatkin has ordered the engineer corps to macadamize the highway northeast of Moukden as far as Harbin for the artillery. Over 2000 workmen are being employed in the work.

ROADS, PAHANG, F. M. S. PUBLIC WORKS IN 1903.—The largest expenditure from annually recurrent votes was incurred on the maintenance of the Pahang Trunk Road from the boundary between this State and Selangor to Lipis, a distance of 62 miles; and on the upkeep of the road from Tras to Bentong, 21 miles. A sum of $41,188 was spent on the trunk road, the cost of maintenance per mile being $568 on the hill sections, against $775 the year previous, and an average of $426 through easier country, against $381 in 1902. The amount spent on the Tras-Bentong road was $15,735, or $749 a mile. Most of the old timber bridges have now been abolished on this road, concrete tubes being substituted.

The following were the principal works executed under the heading "Special Services: Roads and Bridges." Seven sets of iron-work were purchased for the substitution of permanent for temporary bridges on the trunk road, and their erection was commenced. An 18 feet span bridge was completed at Bukit Telaga, and 12 cubes of concrete were laid in the foundation for the centre pier near the 42nd mile. This pier is being built as a monolithic block, the concrete being cast in flexible iron castings which are removed as the work progresses. In addition to the above, 28 old timber bridges have been replaced by concrete at different points on the road. The earthwork of the road from Raub to Sungei Agas was almost completed; and the Sempam road was gravelled and bridged, where necessary, with concrete tubes. In connection with the supply of metal, the most important item was the construction of a quarry shoot at Bukit Telaga. This shoot, which is 250 feet high and is lined with galvanized iron, is fixed on a slope of 1½ to 1 to a high level quarry, and delivers direct into trucks below. It has proved highly satisfactory and effects a great saving in cost of metal. The quarry is a good one and may be used for many years to come.

There are now 160 buildings, the property of Government, in the State, and, of these, 35 were either completed or commenced during the year under review. The mileage of roads under maintenance is 151½, of which 91 miles are metalled cart roads and 60½ miles are bridle paths and natural roads.

There are only two steam rollers in the State, but another is on order and should be working this year.

BRIDGES

BRIDGE, PENANG.—The Municipality of Penang is meditating the raising of a loan to the amount of $600,000 for sundry works, including the raising of a bridge at Sungei Penang, to cost $700,000. It was proposed to ask Government to pay the whole cost of raising the bridge.

MISCELLANEOUS.

MILL EXTENSION, HONGKONG.—The Hongkong *Telegraph* notes that the Haiphong yarn mill is increasing the number of its spindles from 20,000 to 35,000. There will be a consequent increase of horse-power by the addition of a new boiler to the existing plant. At Namdink there are 20,706 spindles and at Hanoi 10,068. There are close upon 20,000 mill hands employed in the three establishments. We understand that this increase of plant will be made so as to allow of the company obtaining a greater share in the trade on the Yunnan market.

MEAT PACKING PLANT, NEW ZEALAND.—The Power & Mining Machinery Company (formerly the Loomis-Pettibone Gas Machinery Company of New York, and successor to the Holthoff Machinery Company, of Cudahy, Wis.), 52 William street, New York, has just been awarded a valuable contract for the equipment of the new power plant of the Wellington Meat Export Company—a British capitalized concern, which operates large works at Wellington, New Zealand. The value of the contract is almost $125,000. The existing power plant is operated by steam, and, owing to the excessive cost of coal, the installing of the gas generating equipment and electrical machinery, for which the Power & Mining Machinery Company has the complete contract, is expected to result in a saving of 75 per cent in fuel. There will be a 3,000 horse-power gas generating outfit, comprising six generators of 500 horse-power capacity each, to operate on the Loomis-Pettibone system. Crossley two-cylinder horizontal gas engines will be installed. There will be nine engines, aggregating in all 1,415 horse-power. Three will be of 225 horse-power capacity each, directly connected to 150-kilowatt direct current 250-volt electric generators. There will also be two 200 horse-power Crossley engines, one 160 horse-power, one also a 100 horse-power engine, which are to be used for driving refrigerating machinery. Gas generators by the same plant will also be used for the large melting and heating kettles. The entire power plant will be in full operation, it is anticipated, in December of this year. W. H. Morse, one of the Power Company's engineering experts, is now in New Zealand regarding the contract. The electric generators have not yet been purchased. —*New York Ex.*

THE INDIAN MINTS.—Lieut-Colonel Porter, R.E., who has just been appointed Mint Master at Calcutta, will proceed next year to the United States to see the system at work in the San Francisco and Philadelphia Mints, which are credited with being the most efficient in the world. He will make himself acquainted with the details regarding the electric machinery employed, as it is intended to have eventually the very latest of installations in the Calcutta and Bombay Mints.

SOAP FACTORY, KUALA LUMPUR, F. M. S.—A Singapore firm of soap makers intends, it is said, establishing a soap factory in Kuala Lumpur. A license to manufacture it at a place right in the heart of the town has been refused by the health officer on the ground of sanitation.

SAW MILL, PENANG.—On the 1st July, the works of the Penang Saw Mill Co. were opened at Sungei Pinang, there being fully one thousand people present to witness the proceedings.

COAL, U. S. A. TRANSPORTS.—It will be remembered that the tenders invited by the Depot Quartermaster's Office of the United States Army at Nagasaki, for the supply of coal to the U. S. army transports, from July, 1904, to June, 1905, were forwarded by Captain Barker to the Manila Government on the 3rd of last month. It is now learnt that the proposal which the Mitsui Busan Kaisha made to supply Miike coal at $3.00 (U. S. gold) has been accepted.

NEW SLAUGHTER HOUSE, AMOY.—A Municipal slaughter house has been built on Kulangsu and will be in working order on the 10th inst Something like this has been wanted for a long time, as the meat supply in Amoy is of a most inferior description.

AGRICULTURAL MACHINERY, AUSTRALIA.—New York, June 30.—The United States & Australasia Steamship Company is loading at pier 12, East River, the ship "Roanoke," for Melbourne and Australian ports. She will carry 6,000 tons of agricultural machinery, lumber, etc., and will be the largest sailing vessel which ever left this port for the Antipodes.

CONDENSERS, JAPAN.—The Wheeler Condenser & Engineering Company, 42 Broadway, has secured a contract for condensers to be installed in the new central power station of the Tokio Street Railway Company at Tokio, Japan.

SUGAR MACHINERY, F. M. S.—Machinery of the latest type costing $120,000 has been introduced into the Jin Hing Estate by Mr. Heah Swee Lee, who has thus been enabled to use the refuse cane as fuel instead of firewood.

WEIGHBRIDGE, SHANGHAI.—A public weighbridge capable of weighing 16,000 lbs. has been erected near the Victoria Fire Station.

Robert B. Stanton has resigned as engineer of the United Mining & Development Company, No. 66 Broadway, and has sailed for the Dutch East Indies, to examine mines in this part of the world.

Knox, Schlapp & Co., Limited, of Perth, West Australia, has placed a substantial order for a breaker plant with the Allis-Chalmers Co. of Chicago.

TELPHERAGE PLANT, JAPAN.—The United Telpherage Company, Commercial Cable Building, Broad street, has secured a rush contract by cable from the Japanese Government for a complete telpherage plant, which is to be used for loading coal into war vessels. The machinery is to be shipped within 30 days.—*N. Y. J. of C.*

SUGAR MACHINERY, JAPAN.—Shotaro Ohashi, of Okazari Machi, Mikaloa Province, Japan, is in the market for sugar refining machinery.

ELECTRIC LIGHT PLANT, MALOLOS, P. I.—Mariano Uy Chaco, the well-known contractor of Manila, is installing an electric light-plant for the Provincial Building at Malolos, the capital of the province of Bulacan.

The plant consists of a 150 light C. and C. generator belted to a 30 h.p. Meitz & Weiss kerosene engine. The building will be lighted by 100 incandescent 16 cp. lamps, and 6 arc lamps through the grounds, besides 12 desk fans in the offices. Mr. F. W. Bohler is in charge of the work.

RAILROADS

Malacca Railway.—At a meeting of the Legislative Council, held at Singapore, July 2nd, the Colonial Secretary moved "That this Council approves the expenditure of a further sum of $400,000 on account of Special Services, Malacca, Item No. 9, Malacca-Pulau Sebang Railway, of the Public Works Department Budget, in addition to the amount already voted in the Supply Ordinance 1903, for this service." In the estimates of expenditure for the current year, he said, there was the provision of $600,000 towards the construction of the Malacca Railway. The work of construction appeared likely to proceed at a much more rapid rate than had been anticipated when the estimates were prepared. Indents had been sent home for rolling stock, etc., covering a cost of over $500,000. It would be evident to the Council that much more than $600,000 which had been provided would be required during the current year, and they now asked for an additional $400,000. The total revised estimate of the railway exceeded two millions.

The Colonial Treasurer seconded and the motion was adopted.

The Kunlon Ferry Route to China.—It is strange how quietly British merchants seem to have acquiesced in the idea, promulgated at the time of his visit to Burma by Lord Curzon, that it would be a useless expense prolonging the Burma Railways from the Northern Shan States to the Kunlon ferry, because of the insignificant amount of trade that might be expected after the line had been laid. It is not in this spirit that Russia lays down her railways, and had the same policy prevailed in Africa, we should not now have placed Uganda in communication with the sea. The British Government being composed of men who are not traders, it is difficult for them to recognize the importance of commercial matters. The Kunlon ferry itself is not perhaps a place where there is much trade at the present time. But it is close to the Chinese frontier, and we may be certain that if it were within railway communication with Rangoon, it would rapidly develop into a place of considerable commercial importance. Russia, France, and Germany are doing all they can to push their Chinese trade, and England should certainly not be behindhand in securing what she can. There are no doubt more remunerative railway projects within our own territories which are now being taken in hand. But the extension of the Burma Railway system to the Kunlon ferry is of political importance, and would also, if it were taken in hand, probably prove remunerative in a few years.—*Rangoon Times.*

The Canton-Hankow Line.—It is reported that the Director General of Southern Railways has telegraphed to the Board of Foreign Affairs that he has received a telegram from Mr. Fuguson(?) saying that although the government of the United States recognizes that it has power to manage the affairs of the American Company known as the Huamei Hosin Kungssu, which is now undertaking the construction of the Canton-Hankow trunk line, it has neither power to prohibit American companies from selling their shares to foreign capitalists nor restrain them from accepting foreign capital, so that the government cannot do anything except with regard to the sale of part of the shares to Belgians. At the conclusion of the telegram the Director General says the cancellation of the agreement signed five years ago between the Chinese Government and the promoter of the said company cannot be achieved at present, but possibly some of the articles can be altered so as to retrieve some of the lost advantages.—*P. and 7. Times.*

New Railway Route to China.—*Vienna to Shanghai in Eight Days.*—In an Austrian review Dr. Convall Spatzier outlines a project for a new railway route to China. The route of this new railway, starting at Constantinople, crosses the Bosphorus to Haidar Pasha by the proposed Abdul Hamid Bridge or by ferry-boats, utilizes the Anatolian system, actual and projected, to Erzerum, passes from the basin of the Euphrates into that of the Aras, follows this valley to the plains of the Kura, passes along the southern shore of the Caspian Sea, ascends the valley of the Atrak, then beyond Kuchan, passes into the valley of the Keshef Rud, crosses the Hari Rud on a bridge, follows the upper course of the Amu Darya, passing through Faizabad (1,060m.) and the valley of the Kokcha, till it enters the Pamirs. Here the difficulties become serious, but not insuperable. The line passes through Ishkashim (2,650m.), ascends for 300km. the valley of the Panji till at a height of 4,000m. (its highest point, which would be lessened by a tunnel), it passes from Afghan territory to Chinese territory on the Tagh-dum-bash Pamir. There the line would descend 2,000m. in 150km., and the plain of Eastern Turkestan at a height of 1,350m., and would form a difficult section to construct, but not a problem impossible to solve. From that point the line passes through the Cherchen valley and skirts the tableland of Tibet, passing through Tsaidam (500km.) (2,830m.), and then south of the Kukn-nor reaches the basin of the Hwang-ho. After following the valley of the Hwang-ho (2,620m.), it passes above Kung-chang into the valley of the Wei-ho, through Si-an-fu, and arrives at the great bend of the Hwang-ho at Tung-kwan, and follows along the right bank to the Yangtsze. From that point one branch leads to Peking, while the other quits the valley of the Hwang-ho and proceeds to Yangtsze, which it reaches twenty kilometres below Nanking, and thence across the river and onward by rail (265km.) to Shanghai, or down the river (320km.), to Wosung, the outport of Shanghai.

At the Yangtsze, where the line quits N. and S. the Hwang-ho, a branch would join this route to the Canton, Hankow, and Peking system. Thus the commercial towns on the Pacific would enter into railway connection with the inland towns of the empire.

Dr. Spatzier discusses the time the journey would occupy by this route to the Far East. From Vienna to Wosung the approximate distance is estimated at 11,920km.; from Vienna to Peking, 11,646km. Taking for his standard of speed the express from Paris to Marseilles, 863km. in 12 hours 50 minutes, say, 67km. an hour, or 1,610km. a day, with twelve stops, he finds that the time of transit would be 7 days 14 hours and 7 days 10 hours from Vienna to Shanghai and Peking, in place of 17 days 8 hours estimated for the Trans-Siberian route.

The Director-General of Siam's Railways.—Mr. Hermann Gehrts has how retired from the position of head of the Royal Railway Department, and he left Siam for good by the *Deli* this afternoon. The Department had been formed about a couple of years before his arrival in the country, but the actual work of construction was only beginning when he came, so that he has had an important share in framing and carrying out Siam's railway policy, and his departure breaks a link with the past in the local railway world. Mr. Gehrts arrived in Siam in January, 1893, to take up the post of superintending engineer, in charge of the technical office and the Bangkok section of the first State line. On the death of Oberbaurat Rohns, Mr. Gehrts succeeded him, on the 28th September, 1894, as Secretary and Chief Engineer. Mr. Gehrts was the third to hold that position in the Department, Mr. Rohns having been preceded by Mr. Asmann. Moreover Mr. Gehrts is fortunate in being able to retire after his eleven and a half years service, while still comparatively young and vigorous; his two predecessors in the second position and his one predecessor at the head of the Department all died in Siam. On the lamented death of Mr. Bethge, Mr. Gehrts was promoted to the post of Director-General, on the 3rd May, 1900. Since he has been in the Department there have been constructed and opened to traffic the 309 kilometres of the Korat and Lopburi lines, and the 151 kilometres of the Petchaburi line—a total of 460. At the present moment the work of laying the rails is going on along the Lopburi to Paknampoh section of the Northern line, earth-work and bridge-work on the Paknampoh to Pitsanuloke section, and surveys on the section from Pitsanuloke to Utaradit and Lakon Lampang. From the beginning of January to the end of April, in 1901, Mr. Gehrts was in the north making a personal survey of the possible routes for this line. It was then that the route was finally decided on. From Paknampoh he went up by Raheng, Muang Tern, Lakon, Muang Ngao, Prayao and Chiengrai to Chiengsen and across the Mekong there, and returned by Wieng Papao, Lakon, Chiengmai, Lakon, Phrae, Utaradit and Pitsanuloke, so that he was over both the main branches of the river. He decided that from Utaradit the line must run to Lakon direct, not via Phrae. Since then Mr. Gehrts has been twice to Pitsanuloke and once to Utaradit in 1903 and 1904. Siam has not been unappreciative of his services, as is shown by the fact that he has received from His Majesty the 3rd class of the order of the White Elephant and the 2nd Class of the Order of the Crown of Siam, with star. Mr. Gehrts is going home across India, and is proceeding in the first place to Darjeeling, where he will make a short stay.

Mr. L. Weiler has been appointed to succeed Mr. Gehrts as Director-General of Railways. They came out to Siam together in 1893, and Mr. Weiler was for five years in the Dong Phya Fai—section engineer in Pakpreo and Hinlap—so that the new Director is not without knowledge of the country. From Siam Mr. Weiler went to China as Superintendent Engineer on the Shantung Railway, and more recently he held the position of Chief Engineer in Asia Minor in the Turkish service.—*Bangkok Times.*

Hankow-Szechuan Railway.—A Peking despatch, dated the 23rd inst., states that keen competition exists between the British and French agents to obtain the right for the construction of a railway from Hankow to Szechuan in South China. The said agents have approached the Chinese provincial authorities, through their respective Consuls at Chung-king, but their efforts have been fruitless. On the other hand, the above Chinese authorities have organized a body entitled the Hankow-Szechuan Railway Company, which intends to build the railway with Chinese capital raised in Szechuan province. At the same time the British and French Ministers at Peking have been asked to notify their respective nationals that there is no possible hope for either of the parties to secure the concession. The message further says that the Chinese authorities have dispatched 14 students to Belgium and several others to Japan in order to study the railway systems of those countries, while several commissioners have been sent to Shanghai and Hankow for a similar purpose. Referring to the above, the Peking correspondent of the journal believes that, if the foreign agents combine, no difficulty will be experienced in obtaining the right of construction of the above railway.

THE GERMAN SHANTUNG RAILWAY.—At the general meeting of the Shantung Railway Company held at Berlin on June 1st, it was announced that a cablegram had been received to say that the whole of the line between Tsingtau, Weih-sien, and Tsinan-fu was thrown open to traffic last Tuesday. In the report for 1903, issued by the management, great stress is laid upon the further development of the railway in the following terms:—"Of the greatest importance for the future development of the traffic of the Shantung Railway is, on the one hand, its connection with sea trade, owing to the German settlement at Tsingtau having entered the ranks of the ports of Eastern Asia, and, on the other hand, its connection with the railway lines in the interior of China."

The report refers to the projected railway which is to be built by the Chinese Government from Tientsin to Tsinan-fu, and thence to Chinkiang, near the mouth of the Yangtse-kiang, with a terminus at Shanghai. At Tientsin this projected line will join the Northern China Railway; this junction will bring about a through line of railway between Peking and Tsingtau, and such a line will be of immense importance during the season in which the navigation of the Gulf of Pechili is closed by ice. "Moreover, at Tientsin the line will be brought into direct communication with the Manchurian Railway by way of Shanhai-kwan and Newchwang, and thereby the Siberian Railway will be reached, so that then travellers will be able to go by rail from Berlin to Tsingtau." The receipts of the Shantung Railway in 1903 amounted to 442,239 dollars, and the total expenditure to 289,253 dollars.

JOHORE STATE RAILWAY.—Singapore, July 3rd.—At last the construction of the Johore State Railway has been definitely decided upon. Mr. C. B. Buckley, Financial Adviser to the Johore Government, yesterday received a telegram from the Dato Abdul Rahman giving the news that the Convention had been signed, and that all arrangements were as satisfactory as possible. This means, broadly, that in four or five years at the utmost we may expect a through train service from Singapore to Penang—120 miles of the run, from Johore to Gemeh, being through the Sultan's territory. This section is to be known as the Johore State Railway and will be owned by the State of Johore, but it will be constructed by the F.M.S., the Johore Government paying interest to the F.M.S. on the cost of such construction. When completed, the line will be managed by a joint board of control composed of officials from Johore and the F.M.S.; but that is a matter of detail. It may not be generally known in connection with this new Convention that surveyors from the F.M.S. have been working on both ends of the route since January last; when, acting on the assumption that the Convention would be speedily signed, and with the acquiescence of the Johore Government, the F.M.S. sent down detachments of these pioneers of railway construction, who are still hard at work on the northern section from Sagamat to Gemeh on the boundary line. The terminus of the line will be near the Saw Mills, and there will be no bridge across the Straits. The scheme for this proposed structure was abandoned on the advice of the expert who came from India to make surveys for the project. His judgment was to the effect that the place is an ideal one for a ferry, and a bridge would be an inexcusable extravagance just now. The ferry will carry the train bodily across the Straits to join the Singapore Railway on this side, so there will not be any extra handling of through freight from the Peninsula to the Docks at Tanjong Pagar. The signing of this new Railway Convention between Johore and the Native States marks an incident of vast importance in the development of British Malaya.—*Straits Times.*

AUSTRALIA, LAND GRANT RAILWAY.—Australian advices just to hand state that so far no tenders have been received by the South Australian Government for the construction of the land grant railway between Oodnadatta and Port Darwin. Tenders were due May 2. —*N. Y. J. of C.*

There are curious rumors circulating among the Chinese on the subject of railways in southern China. We understand from several sources, other than native, that the proposed railway from Macao to Canton is not likely to be commenced yet awhile. There has been what is described as "a hitch in the negotiations." The Portuguese representative of the Macao syndicate has left Shanghai, after unsuccessful interviews, and proceeded to Peking to appeal to the Chinese board charged with the control of railway concessions. Sheng Ta-jen, the commissioner of Imperial Chinese Railways, is reported to be somewhat opposed to the Macao syndicate, he desiring to see a few more Chinese who are not foreign subjects interested in it before giving the scheme his approval. There has certainly been opposition from Canton, whether inspired by the Viceroy Shum or by Sheng's representatives. The Chinese are uneasy concerning the sale of the Canton-Hankow Railway concession shares to French and Belgian buyers, and their feeling is developing into strong opposition. Operations in connection with the Swatow to Chao-chow-fu Railway, a small line on the coast, though supposed to be almost entirely in native hands, have been suspended on account of official representations. One rumor, which is most prevalent, affects the British, as it is to the effect that the Peking Government is not now in favor of granting permission for the commencement of the Chinese section of the Canton-Kowloon Railway, but that Viceroy Shum should undertake the construction of this line, the Macao-Canton line, and the Canton Waterworks, on behalf of the Imperial Government, instead of allowing foreigners to work such concessions. These are curious rumors, and, the Chinese Government having granted a concession to the British syndicate to construct a line to Canton, it is difficult to see how they can withdraw it if they so desire, unless they have the power, which may be retained in the shape of a time clause. The average resident is not likely to seriously worry his soul concerning the builder, providing he sees outward and visible tokens of a railway before retiring in due course of time to the old country on a competence.

THE PENANG HILLS RAILWAY.—The works are progressing satisfactorily, and the earth work is practically completed. The rails have been laid about half way up the Hill, and rails for the upper half are now being hauled up before the laying is commenced; about half the pipes for the hydraulic installation have been laid, and the machinery has been erected, including the Pelton wheel.

The system is that of a cable railway, with the power at the bottom of the Hill. Two cars will be attached to the cable, one ascending while the other descends. Each car will take ten or twelve passengers, and make the journey in about ten minutes. Facilities will be provided for carrying goods and bazaar baskets. There will be one station at the top of the Hill and one at the bottom, and passengers will be able to alight at any point between them by informing the conductor, in the same way as in the ordinary street trams. The fares are under consideration just now.

The number of trams running daily will depend on the amount of traffic, but it will be possible to run one car up and one down every quarter of an hour.

The length of the railway is about one mile and a half, and when finished it will, I believe, have the distinction of being the longest cable hill railway in the world. Arrangements are being made for an electric tramway from town to connect with it at the bottom.

Work upon the railway was commenced in the beginning of November last year, and will probably be completed about the end of August. Mr. C. E. Paterson is superintending the earth work and plate laying. No unexpected delays have been met with, and there have been no serious accidents to any of the workmen.—*Penang Gazette.*

PROPOSED CANTON-MACAO RAILWAY.—A Peking letter states that a Portuguese gentleman is now in the capital trying to get the permission of the Shangpu and Waiwupu to construct a railway between Macao and Canton. It seems that this gentleman first went to Shanghai and approached H. E. Sheng Kung-pao with the object of making the proposed railway a private one, and a modus vivendi had even been settled upon, when, it is reported, H. E. Viceroy Tsen Ch'un-hsuen of Canton wrote to H. E. Sheng Kung-pao, asking the latter to delay signing any agreement concerning the railway. The Portuguese gentleman, therefore, wearied with the delay in getting things settled in Shanghai went to Peking to work his scheme officially through the Boards of Commerce and Foreign Affairs.

PROPOSED RAILWAY, F. M. S.—We have it on good authority that an enterprising firm has submitted a scheme to the Government to run a railway line between Penang and Grit, the capital of Upper Perak and the New Territory. This has been recommended by Mr. W. P. Hume, the then District Officer, New Territory, and now the Acting Senior Magistrate at Ipoh. It is understood that, the distance between these places being so very short, the Government will favorably consider the scheme.—*Straits Times.*

THE PEKING-CHINKIANG RAILWAY.—The Tsingtao correspondent of the *N. C. Daily News* writes that there seems to be a hitch somewhere in this contract which was given to a German-English syndicate, work to be begun as soon as the Tsingtao-Chinanfu line was finished. Surveying had begun, and the engineers were ready to begin work on both ends of the line. Now the contracts of the engineers have been cancelled, and they are leaving next month for home. It is supposed that there is some trouble with the Chinese.

SEOUL-FUSAN R. R.—It is reported that the Japanese company which is constructing the railway between Seoul and Fusan is now making arrangements to inaugurate traffic on the sections already completed. On the western section, a length of 83 miles from Seoul to Pukang is nearly completed, while rails have already been laid down to a length of 70 miles between Fusan and Taiku. Traffic on these lines is expected to be opened to the public either at the end of September or early in October next. The total length of the railway will be 273 miles.

KYUSHU RAILWAY EXTENSION, JAPAN.—The arrangements having been made for the extension of the Kyushu Railway line from the Urakami station as far as the reclaimed land at Deshima, Nagasaki, the Company is reported to have recently applied to the authorities for permission to take the work in hand. The fund for the undertaking is estimated at Yen 800,000, exclusive of that for the construction of a large station at Daikoku-machi.

YOKOHAMA RAILWAY EXTENSION.—It is announced that the Yokohama Railway authorities have applied to the Government for leave to construct a railway between Yokohama and Hachioji. The line will probably start from Nakakido, Kanagawa, where a station, to be connected with the Yokohama station of the Government Tokaido Railway, will be established. The line will be made an elevated one to a certain point.

The Bombay-Baroda and Central India Railway Company have obtained sanction to carry out a survey of a proposed line of railway from Hansi Station, on the Rewari-Ferozepore Section of the Rajputana-Malwa Railway, to Jakhal Station, on the Southern Punjab Railway, a distance of 49 miles. The survey is placed under the control of the Government of Bombay.

Shanghai-Nanking Ry. Loan.—London, July 14.—The *Morning Post* says that a Chinese Imperial railway loan of £2,250,000 was issued to-day at 97½, bearing interest at five per cent. The loan is for the construction of a line from Shanghai to Nankin, and subscribers will receive one-fifth of the net profits of the railway.

Flat Cars, Korea.—A considerable number of second-hand flat cars are to be shipped through the Japanese house of Mitsui & Company, 445 Broome street, New York, and the American Trading Company, for use on the Seoul-Fusan Railroad, Corea. They will go over the Great Northern and Southern Pacific lines.

Shanghai, June 18th.—Work on the Shanghai-Nanking Railway has been suspended owing to deficiency of capital since the conclusion of the contract. Recently an agreement was made between the Chinese officials and a syndicate, so that the work will be soon recommenced.

Tsao-chow-Swatow Ry.—It is announced that the construction of the Tsao-chow-Swatow line of rail in Eastern Canton province will start as soon as the required capital has been fully subscribed by Chinese merchants and officials at Canton, Hongkong, and Singapore.

Hokkaido Railway, Japan.—The Yamamichi-Ozawa section, eight miles long, of the Hokkaido Railway was recently opened to traffic, and it is expected that the whole line between Hakodate and Otaru will be ready for traffic towards the beginning of September.

Seoul-Fusan Ry.—Another call of 5 *yen* per share on the Seoul-Fusan Railway Company's shares is to be paid by September 15.

New Railway, Manchuria.—It is reported that the Russians are building a branch railway north of Fengtien. Two thousand workmen are engaged on the road, working day and night, and it is expected that the work will be completed at the end of July.

A message from Antwerp states that a Franco-Belgian syndicate has obtained two important concessions in China, a railway concession in Shensi and a tramway in Tientsin.

The Luhan Railway line from the South has now been carried to within thirty miles of the Yellow River, and it is now possible to travel from Kaifong to Hankow in two days.

Chinese Railways.—Shanghai, June 2nd.—It is reported here that Germany has already obtained the right of laying a railway from Putung (opposite Shanghai) to Kangchou.

An extension of the Hokkaido Railway between Sando and Ozawa, a distance of over eight miles, was opened on Thursday.

SINGAPORE-KRANJI RAILWAY

The annual report by Mr. W. Tearle, Manager, reads as follows:—

The Singapore and Kranji Railway was opened for traffic as far as Bukit Timah in January, 1903. The service was started with nine trains each day, but was reduced to eight trains a day at the end of a week.

From April 1st two trains each way ran through to Woodlands and seven to Bukit Timah; from July 16th three trains each way ran through to Woodlands and six to Bukit Timah; from October 1st the service was six trains to Woodlands and three to Bukit Timah only, and this continued to the end of the year. It will be seen from the above that the department has not had the full revenue earning advantage of the railway during the year 1903.

The mileage of the railway up to December 31st, 1903, stood at 15 miles permanent way and one mile for ferry service from Woodlands to Johore Bahru.

The capital account to 31st December, 1903, was $1,808,353.55. The dividend earned on this capital was $41,066.27, equal to 2.27 per cent. The average capital outlay per mile of line open was $113,022.09 as against $91,365 per mile open on the Federated Malay States Railways.

The total revenue from all sources amounted to $135,928.08. With the exception of $1,877.35 for goods traffic, the whole of this amount was earned by coaching. The net earnings per train mile were 68 cents.

The working expenses for the year amounted to $94,861.81. The proportion of working expenses to gross receipts was 69.79 per cent. This is very heavy, but may be explained as under:—

(1) A large staff comparatively was employed for the working of four Stations for most of the year: the same staff has performed the work for eight Stations since.

(2) Heavy incidental expenses were incurred in connection with the opening of the railway, such as transport, furniture, printing, etc., which will not recur.

The railway was expected to earn a large proportion of its revenue from suburban residents. This expectation has not been realized. On April 1st, 1903, there were 19 season ticket holders. On April 1st, 1904, there were 31 season ticket holders. I am afraid that this is owing to the Singapore terminus being so far from the centre of the town. This should be remedied when the tramway runs along River Valley Road to the Post Office.

Pleasure seekers are the chief source of revenue on the Singapore and Kranji Railway, and Sundays are the most profitable days. Two-thirds of the revenue is due to this class of traffic. There is very little goods traffic, but there is every prospect of a large granite traffic from quarries between 9th and 11th mile, and a siding will be put in specially for this purpose at 11th mile. The 1st and 2nd class passenger traffic bears an extraordinary proportion to the 3rd class on this railway as under:—

1 First. 1.05 Second. 8.70 Third.

On the Federated Malay States Railway the proportion is—

1 First. 3.50 Second. 44.12 Third.

The Traffic Department had two engines to carry on the work, but they were in an unsatisfactory condition when taken over. A third engine was used for ballasting up to the end of the year, and a new engine was ordered from home. Coal is used as fuel, but not being of a high quality it makes a lot of black dust, which has caused many complaints. A canvas screen has been put up in front of 1st class carriages, which has considerably reduced the nuisance. It would be worth while to consider the use of oil as fuel, provided a sufficient quantity could always be relied upon at a low price.

Engine mileage for the year 68,272.

The s. s. *Singapore* was taken over on 1st April, 1903, and the s. s. *Johore* on 20th September, 1903. They have worked very satisfactorily, but are not of a good design for both passengers and goods traffic.

The line was taken over before it was quite completed, and trouble has been experienced as usual when this is done. When a considerable number of trains are run, the work done between the trains can only be sufficient for ordinary maintenance. There are several weak places on the line, and it will take some time before the permanent way throughout has become consolidated. There is an improvement in the road, but it is advisable to keep the speed low. The buildings and quarters on the railway are mostly of a temporary nature, and several will have to be renewed next year. The bridges over Killiney Road and Orchard Road are quite safe. The question of their stability has been put to me so many times that I think it should be recorded for information of the public, that they have been examined by several experienced Engineers, who have all pronounced them to be safe.

Communication between stations is carried on by telephone, which is not a satisfactory means for the working of a railway where the native officials' knowledge of English is very imperfect. The telegraph instrument, where every word is spelt out, is much more satisfactory. The telephones have been well maintained by the Telephone Company.

There was only one accident during the year, a brake van going beyond the line at Woodlands and partly going down the bank. No one was injured and the damage was trifling. The person responsible for the accident was dismissed and the siding was lengthened as a precaution.

There has been a considerable amount of sickness on the railway, mostly fever. Woodlands gave a great deal of trouble when we opened to that station, as every one employed there had to go to hospital sooner or later and most of the cases were of a severe nature. I am glad to say that latterly there has been a great improvement in the health of the employees at that station. I have found here as I did in Selangor that good water has a very marked effect on the health of the staff, and Singapore water is now sent to all stations.

There have been 26 prosecutions for minor offences.

I have experienced considerable difficulty in getting men with any railway experience to join this railway for station work, and, with the exception of the men I brought from Selangor, those I have taken on here have been disappointing. I have had to dismiss more men for drunkenness on this railway in one year than I did in eight years on the Selangor railway. The Staff in the general offices have given satisfaction.

The very large capital account of this railway will always militate against a large dividend being earned, and though the earnings are very satisfactory for this year under the adverse circumstances which obtained, I cannot see any prospect that unusual dividends can be earned until there is a heavy through goods traffic between Singapore and the Native States, and then the question of a double line between Singapore and Woodlands will have to be considered, or goods traffic will have to be dealt with at night. Should a large suburban population grow between Singapore and Bukit Panjang, the train service will have to be very much increased, and this again will interfere with the prompt despatch of goods traffic.

SHANGHAI-NANKING RAILWAY LOAN

The following advertisement was published in the Hongkong and Shanghai papers on the 16th July:

For £3,250,000 Sterling, of which £2,250,000 (less £750,000 already applied for, and which will be allotted in full) are now offered for public subscription in London, bearing interest @ 5% per annum and carrying 20% Surplus Profit Sharing Bonds.

Authorized by Imperial Chinese Government Edict.

The Hongkong and Shanghai Banking Corporation, 31, Lombard Street, London, are authorized, as Agents for the British and Chinese Corporation, Ltd., to invite subscriptions for £1,500,000 Sterling Bonds of the above loan.

The price of Subscription is 97½ per cent, payable as follows:—

5 per cent. on application.
20 per cent. on allotment.
20 per cent. on 23rd August, 1904.
15 per cent. on 20th September, 1904.
15 per cent. on 18th October, 1904.
22½ per cent. on 22nd November, 1904.

97½

The Subscription list will be opened in London on Monday, the 18th July, and close on the following day.

Applications will be received at this Office, and wired to London not later than Noon on Tuesday, the 19th inst., and should be accompanied by a deposit of 5% on amount applied for.

For Hongkong & Shanghai Banking Corporation.

J. R. M. Smith,
Chief Manager.

Hongkong, 16th July, 1904.

RAILROADS IN THE PHILIPPINES

The most important measure confronting the progress of the Philippines is that dealing with the construction, equipment, operation, and maintenance of the necessary railroads for the proper development of their many resources. The problem is one requiring considerable thought and expert manipulation. On the outcome of the present plans depends largely our success as a colonizing power, and the length of time before the Islands can be brought to a state of prosperity, and placed on a self-supporting basis. Railroads are absolutely essential to this end, in addition to their being a potent factor in the moral development of the natives. More than any other influence, they will tend to a unification of the various tribes and so abolish the embarrassing diversity of dialects which so hampers the working of the government and the extension of trade.

The enhanced value of the lands, the stimulus given to agriculture, the development of the towns and villages, with the attendant increased commercial activity, will soon create a better industrial and moral condition amongst the people.

Although the benefits of the railroads are apparent to all conversant with the Philippines, the problem presents certain difficulties, and can not be treated in an off-hand manner.

Under the active campaign of Secretary Taft, Congress considered the matter during the last session, and the House passed a bill authorizing the general government of the Philippines to "guarantee an income of not exceeding five per centum upon cash capital actually invested in the construction and equipment of such railroads or any part thereof."

The guaranty must be in form requiring repayment of any sum paid, "as said Government shall deem to be for the public interest," and the Act making the guaranty must "declare the proper rules" for ascertaining the cash capital actually invested and the net income actually received from it, and must set forth the limit of capital to which it shall apply. Provision must be made for Government supervision of the finances of the railroads, their location, construction, and maintenance, for the presence of two or more Government directors in any board of direction, and for "such further supervision through the auditing, engineering and railroad bureaus of said Government as the public interest shall require." The guaranty may be in the form of interest on bonds, dividends on stock, or "in such other form as may be determined by said Government, and shall be on such terms and conditions as said Government shall approve;" but the total contingent liability incurred cannot exceed $1,500,000 a year and no guaranty can extend beyond thirty years.

There is still the possibility that, despite this desire on the part of the Government to assist the Philippines, the co-operation of the capitalists may be delayed by other conditions not in evidence at the outset. These obstacles, while undoubtedly greatly exaggerated, will be taken into consideration by any corporation created for building the roads. Although we are perfectly satisfied at this end that there is sufficient labor in the country to carry on the work, it may be necessary to convince the capitalists of this most important feature.

Several commercial organs of the Homeland have commented on this point, advocating the admission of Chinese in case the native labor fails to come up to expectations. This is looking rather far ahead, but it is an eventuality that is bound to be considered. The success attending the employment of Filipinos as laborers, in the construction of the street railway and harbor works, augurs well for the same labor in the more extensive work, and with proper remuneration and treatment there is no reason why they should not meet all expectations.

There must be something more than the mere statement however, to satisfy a construction corporation who will have to expend some $35,000,000 in the performance of their part of the contract.

Major Kennon on the Benguet Road is demonstrating that the average Filipino, if properly handled, can be utilized to good advantage at this class of work. If they are a success there, they certainly will give the same results on similar work elsewhere. The secret of handling the Filipino and getting the most out of him seems to have been partially solved, at least, by treating them kindly, allowing their women to live in the camps, permitting cockfights, and tolerating their milder forms of vices and amusements.

The labor proposition is greatly exaggerated, and is constantly put forward by the enemies of the Philippines to retard their progress. It is the natural outcome of the old feeling engendered by the war, and carried to the Homeland by the thousands of discharged soldiers, embittered by their experience with the natives. Labor is here in plenty, and under the changed conditions, there will be no trouble in securing ample workmen for the construction of the roads.

Another objection advanced to the difficulty of interesting American capital in the building of the roads, is the present policy controlling the trade of the islands, and the action of the tariff and shipping laws in throttling the development of the industries.

This is a matter that seems reasonable to expect will be fully settled during the next session of Congress, for if the Government is really desirous of developing the Islands, they are not going to keep in force a set of laws and regulations which defeat the very end they are struggling to attain. The extension of the Coastwise Shipping Laws to cover the Islands is a step which will be hard to reason away when the tariff debate is reopened. Either we are part of the United States or we are not. The shipping law will be of no avail, if the ships have no freight to carry, and if the shipping interests were successful in creating this precedent, it seems entirely logical to presume that, with the aid of the administration, they will succeed in carrying the tariff fight, despite the opposition of the pampered beet sugar hosts.

Every indication points to an early settlement of this important matter.

By the establishment of the new internal revenue law, the Philippines are being placed on a basis to meet the expenses of the Government, preliminary to the establishment of free trade.

By the time a corporation had built the roads and placed them in operation, all these questions of tariff will have been eliminated, and the islands well on the road to prosperity. —*Editor*.

PROPOSED RAILWAY LINES

IN THE ISLAND OF LUZON, P. I.

By J. T. NORTON, C. E.

Report to the Civil Governor of the Philippines.

MANILA TO APARRI.

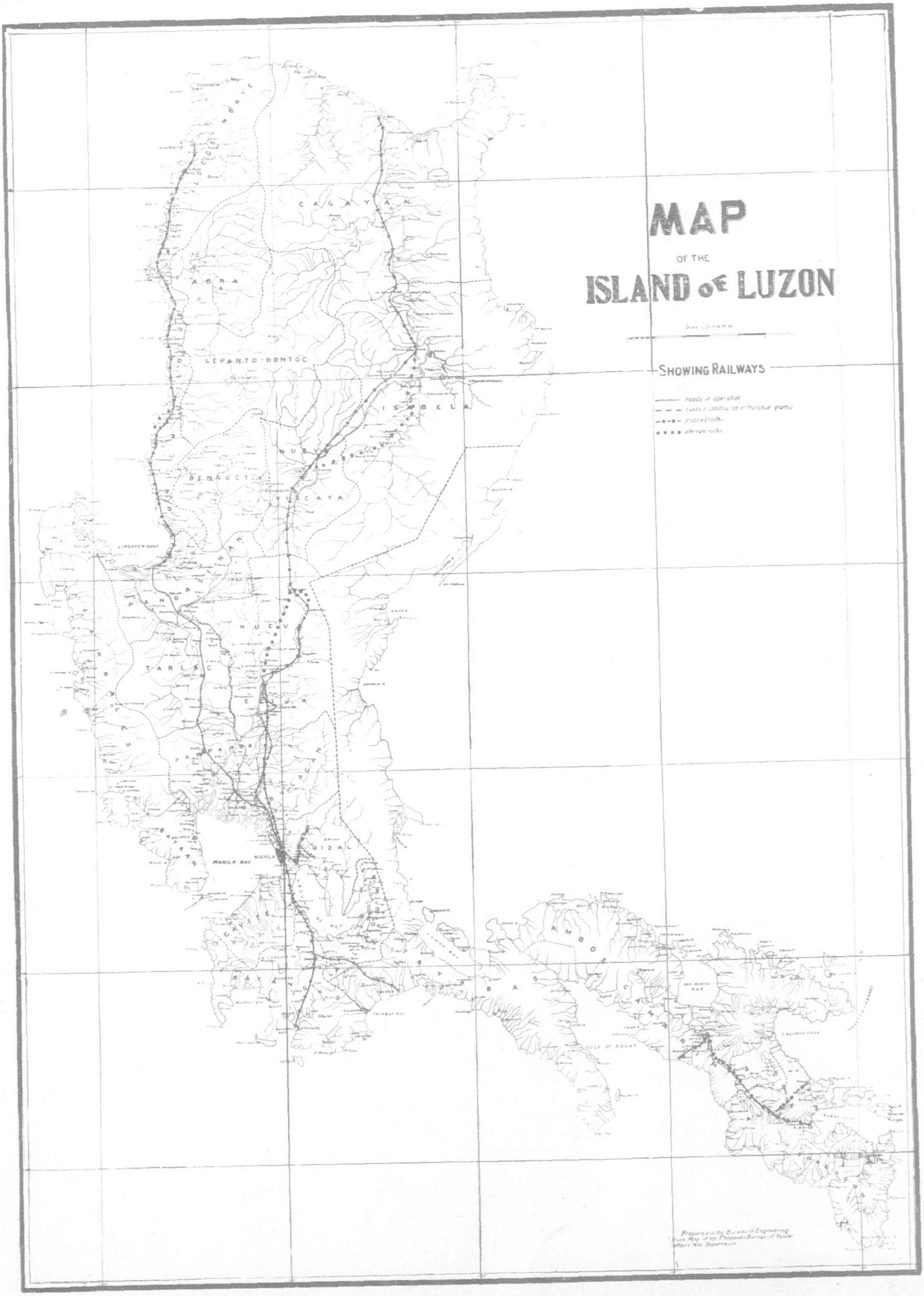
Manila terminal.—Will be governed almost entirely by the cost of right of way and whether passage can be had through Government lands. Access should be had to the new harbor south of the mouth of Pasig River, or to the same river, on south side, below the Bridge of Spain. If neither of these projects is possible, then to the Pasig River above the Bridge of Spain. Terminal switching yards, shops, storehouses, etc., should be located as near Manila as an advantageous site can be had at a reasonable cost.

Route.—As shown on accompanying map is recommended, passing through or near the following points: Caloocan, Meycauayan, Bocaue, Baliuag, San Ildefonso, San Miguel de Mayumo, San Isidro, Cabanatuan, Bongábon, Pantabangan, Carranglan, Caraballo Pass, Aritao, Bayombong, Bagábag, Ilagan, Tumauini, Tuguegarao, Nagsiping, Lal-lo, and Aparri. This follows the valley of the river Pampanga on the left bank to its head, thence over the Caraballo Pass, and down the Magat and Cagayan River valleys, on the left bank of both. It is unfortunate that all the principal towns of the Cagayan Valley are on the right bank. In spite of this, however, the left bank is recommended for the location of the line, as crossing the Cagayan would require a large sum for bridge. There seems little prospect for branches from main line to east and a very good one for branches to west. If main line were on right bank of river, such branches would have to cross the Cagayan. The majority of buildings in all the towns in this valley are of bamboo and grass construction, which are neither costly nor durable. There are alternative locations at three different points, all shown on map by dotted lines. The first crosses the Pampanga at Cabanatuan, going via Talavera, San José, and Puncan, to join the other line at Carranglan. The second is detour to the east between Pantabangan and Carranglan to avoid 3 miles of canyon work. The third leaves the line recommended at Bagábag, going via Diadi, Estella, Carig, Echagüe, Canáyan, and Reina Mercedes, to a junction with the other line between last-named placed and Ilagan. These changes of line are simply possibilities that should be brought to the notice of locating engineers. A horseback reconnoissance over them will doubtless decide at once whether it is worth while to make actual surveys or not. Line recommended. Between Pantabangan and Carranglan there will also be about 3 miles of canyon work. Between Bagábag and Oscarez there is 20 miles of canyon work.

Grade.—A maximum of one-half of 1 per cent compensated can be used on entire line except on the mountain work between Carranglan and Aritao in getting over the Caraballo Pass. This has an elevation of 3,750 feet above sea level, and a grade of 3½ per cent compensated will be needed. The mountain slopes are very steep and liable to slide, especially on the south side; thus it is important to lighten the work as much as possible. Development will begin on south side at an elevation of about 1,150, and end on north side at about 1,550 feet above sea level.

Curvature.—Need not exceed 4 degrees, or 1,433 feet radius, except on canyon work and development on both sides of Caraballo, where 16 degrees, or 359.3 feet radius, will be necessary.

Transportation.—From Manila to Calbanaturan there is a fair road, much of it metaled. It lacks many bridges, however, and some of the existing ones need repairs. From Cabanaturan to 3 miles north of Bongábon the road is little better than a trail, but could be made into a good wagon road at slight cost excepting bridges. From last point to Pantabangan the trail is very rough, and a wagon road would be costly. From Pantabangan to foot of Caraballo wagon road could be made at reasonable cost. There are four large rivers to ford between Manila and Carranglan—the Angát, Rio Gapán, Santor, and Rio Pantabangan. In the rainy season some sort of ferry would have to be arranged at these points. From Aparri river transportation is available in the rainy season to Reina Mercedes, and in the dry season for lightly loaded boats as far as Ilagan, with three or four portages, and possible trouble with sand bars at many other points. This refers only to small "barangays" carrying a few tons. Steamers drawing 12 feet can ascend as far as Lal-lo. Wagon road on left or west bank of Magát River can be easily made from Reina Mercedes to foot of Bennett Canyon, 4 miles south of Oscarez. From here to Bagábag, 20 miles, a wagon road would be very costly. From Bagábag to Bayombong there is a good wagon road, except that bridges need repairing. From Ba-



Prepared in the Bureau of Engineering from Map of the Philippines Bureau of Insular Affairs War Department yombong to foot of Caraballo there is a good trail, which could be made into a wagon road at reasonable cost, but crosses Magát River, which can not be forded for days at a time in the rainy season.

Tunnel.—Report of April 2 last estimated length of tunnel necessary at Caraballo Pass at 1,000 to 2,000 feet. Upon closer examination have changed this to 4,000 feet, and estimate will be made for latter length. Native timber can be used for timbering, if same is necessary.

Traffic.—Is almost an unknown quantity. The whole country is in bad condition from war and pestilence among men and beasts. From Manila to Bongábon is a fine agricultural country and thickly settled as far as Cabanaturan. This portion should pay within a year or two. From Bongábon through to Cagayan Valley much of the country is mountainous and the valleys, while apparently good land, are not thickly settled. Traffic here will be a question of development and settlement of the country by reason of the building of the railway, and will take time. In regard to the Cagayan Valley, the tobacco grown there all goes to Manila, and there is no reason why it should not go by railway, if there were one, as navigation on the Cagayan River, except from Alcalá to Aparri, is difficult all through the dry season by reason of shoal water, and in the rainy season because of swift current. Taken as a whole, the line would hardly pay operating expenses for the first two years, and no interest on capital invested until four or five years. Eventually, if the country develops as it should there will be a heavy traffic, both passenger and freight. Attention is especially called to Nos. 22 and 23, showing tobacco and corn fields in the Cagayan Valley. A few miles south of Aritao and near the proposed line is a vast deposit of fine granite. It is in the shape of large bowlders, covers several hundred acres of ground, and can be easily and cheaply quarried when means of transport are to be had. In the Manila Harbor sea wall there are blocks of granite of no better quality that were imported from Hongkong.

Estimate: Manila to Aparri.

[336 miles.]

ADMINISTRATION AND ENGINEERING.

	United States currency.
General officers and heads of departments, except engineering, 336 miles, at $465	$156,240
Location, 336 miles, at $111	37,296
Right of way, including damage to houses, 336 miles, at $60	20,160
Clearing and grubbing, 336 miles, at $30	10,080
Engineering expense during construction, 336 miles, at $126	42,336
GRADING.	
Manila to lower end Pantabangan Canyon, 1,092,000 cubic yards earth, at 25 cents	273,000
Thence to mouth Pantabangan River, 675,000 cubic yards earth, at 25 cents	168,750
Thence to mouth Pantabangan River, 225,000 cubic yards solid rock, at 85 cents	191,250
Add for slides 5 per cent total yardage, two items above, 45,000 cubic yards earth, at 25 cents	11,250
Mouth Pantabangan River to canyon, 120,000 cubic yards earth, at 25 cents	30,000
Through canyon, 225,000 cubic yards earth, at 25 cents	56,250
Through canyon, 75,000 cubic yards solid rock, at 85 cents	63,750
Add for slides 5 per cent total yardage, two items above, 15,000 cubic yards earth, at 25 cents	3,750
Thence to river above Carranglan, 60,000 cubic yards earth, at 25 cents	15,000
Thence to where development begins, 54,000 cubic yards earth, at 25 cents.	13,500
Beginning to end of mountain grade, 1,453,500 cubic yards earth, at 25 cents	363,375
Beginning to end of mountain grade, 161,500 cubic yards solid rock, at 85 cents	137,275
Add for slides 5 per cent total yardage, two items above, 80,750 cubic yards earth, at 25 cents	20,187
Caraballo tunnel (not included above), 4,000 linear feet, at $52	208,000
Foot of mountain to Bayombong, 232,800 cubic yards earth, at 25 cents	58,200
Bayombong to head Bennett Canyon, 120,000 cubic yards earth, at 25 cents	30,000
Head to foot Bennett Canyon, 720,000 cubic yards earth, at 25 cents	180,000
Head to foot Bennett Canyon, 180,000 cubic yards solid rock, at 85 cents	153,000
Add for slides 5 per cent total yardage, two items above, 45,000 cubic yards earth, at 25 cents	11,250
Foot Bennett Canyon to opposite Oscarez, 48,000 cubic yards earth, at 25 cents	12,000
Thence to opposite Tuguegarao, 552,000 cubic yards earth, at 25 cents	138,000
Thence to opposite Alcalá, 240,000 cubic yards earth, at 25 cents	60,000
Thence to opposite Aparri, 720,000 cubic yards earth, at 25 cents	180,000
Ditching 336 miles, at 300 cubic yards, 100,800 cubic yards earth, at 25 cents	25,200
BRIDGING.	
Creosoted timber trestle, 643 spans, 15 feet each, at $157.15	101,047
Masonry, 50,720 cubic yards, at $8	405,760
Excavation for masonry, 25,360 cubic yards earth, at 50 cents	12,680
Steel bridges in place, 5,377 tons, at $126.90	682,341
Creosoted timber deck for steel bridges, 9,365 linear feet, at $167.74 per 100 feet	15,709
TRACK.	
Rail, 31,685 tons, at $35.75	1,132,739
Angle bars, 1,898 tons, at $56.25	106,762
Track bolts, 171 tons, at $73.15	12,509
Track spikes, 897 tons, at $61.90	55,524
Track ties, creosoted, 2,640 per mile, 887,040 pieces, at $1	887,040
Track laying, 336 miles, at $250	84,000
Surfacing, 336 miles, at $50	16,800
Ballasting, 336 miles, at $800	268,800
Sidings, complete, 4 per cent length of main line, 13.4 miles, at $9,480	127,032
Telegraph line, 336 miles, at $160	53,760
Water service, 22 stations complete, at $2,000	44,000
Total	6,675,602

DAGÚPAN TO LAOAG.

Route.—Starting from Dagúpan, line should pass through or near Mangaldan, San Fabian, Santo Tomas, Aringay, San Fernando, Bagnotan, and Balaoang. Between the last-named and Tagudin the river Anitaragan comes down from the mountains, and on reaching the flat country divides into a number of shallow channels, which, during each rainy season, are constantly filling up and changing. Line should swing to the east and cross the stream mentioned where it comes out of the mountains and has a stable channel. Line will pass near Tagudin and thence through or near Santa Cruz, Santa Lucia, Candon, Santiago, San Estéban, Narvacan, and Vigan. Just south of Vigan line will cross the Abra River, which also has a changing channel. Crossing should be made where river emerges from mountains, for reason mentioned before, thence swinging back to near Vigan. From last point line should pass through or near Santo Domingo, Magsingal, Cabugao, Badoc, Batac, San Nicolas, and Laoag, the terminus. At Currimao, between Badoc and Batac, hills will force line down almost to sea. Line as recommended is shown on map by broken lines. An alternative location is shown by dotted lines opposite Balaoang. This alternative location is longer, but may prove cheaper if the line via Balaoang turns out to be heavy work, as the coast would be light grading.

Grades.—A maximum of one-half of 1 per cent, compensated, can be used over whole line, with possible exception of the two places where line approaches foot of mountains to obtain better stream crossings, where it may be necessary to use 1 per cent, compensated.

Curvature.—Need not exceed 4 degrees, or 1,433 feet radius.

Transportation.—There is an excellent road from Dagúpan to Laoag, except for a few miles near the seashore, where it is rather sandy. Bridges are mostly in good condition, but are lacking at the large streams, which must be forded. The one that will give the most trouble is the Abra, near Vigan. The road is metaled with gravel or broken stone the greater part of the distance. Material and supplies can come by sea to San Estéban, Pandan, and Currimao, except during the southwest monsoon, and to San Fernando and Salomague all the year. Line will be near the sea at all the places mentioned except Pandan and Salomague, where the distance will be about 4 and 2 miles, respectively.

Traffic.—Line will be through a rich agricultural and well-populated country except a few spots here and there where mountains come down almost to the sea. As a rule, the flat coast country is from 5 to 20 miles broad. The line will be expensive on account of the amount of bridging needed, but if the country has no new misfortunes or return of the old ones, it should pay a fair interest on the investment after the first year at least.

Estimate Dagúpan to Laoag.

(168 miles.)

	United States currency.
General officers and heads of departments, except engineering, 168 miles, at $465	$78,120
Location, 168 miles, at $89	14,952
Right of way, including damage to houses, 168 miles, at $80	13,440
Clearing and grubbing, 168 miles, at $25	4,200
Engineering expense during construction, 168 miles, at $126	21,168
GRADING.	
Dagúpan to San Fernando, 522,000 cubic yards earth, at 25 cents	130,500
San Fernando to Balaoang, 224,400 cubic yards earth, at 25 cents	56,100
San Fernando to Balaoang, 56,100 cubic yards solid rock, at 85 cents.	47,685
Balaoang to 4 miles north, 32,000 cubic yards earth, at 25 cents	8,000
Thence to Tagudin, 60,375 cubic yards earth, at 25 cents	15,094
Thence to Tagudin, 20,125 cubic yards solid rock, at 85 cents	17,106
Tagudin to Candon, 205,000 cubic yards earth, at 25 cents	51,250
Candon to Solbec, 259,350 cubic yards earth, at 25 cents	64,837
Candon to Solbec, 13,650 cubic yards solid rock, at 85 cents	11,603
Solbec to 3 miles north, 75,000 cubic yards earth, at 25 cents	18,750
Solbec to 3 miles north, 75,000 cubic yards solid rock, at 85 cents	63,750
Thence to Laoag, 655,500 cubic yards earth, at 25 cents	163,875
Thence to Laoag, 34,500 cubic yards solid rock, at 85 cents	29,325
Ditching, 168 miles at 300 cubic yards, 50,400 cubic yards earth, at 25 cents	12,600
BRIDGING.	
Masonry, 41,608 cubic yards, at $7.50	312,060
Excavation for masonry, 20,804 cubic yards, at 50 cents	10,402
Creosoted timber trestle, 616 spans 15 feet each, at $162.15	99,884
Steel bridge in place, 5,097 tons, at $128.90	657,003
Creosoted timber deck for steel bridges, 8,700 linear feet, at $177 per 100 feet	15,399
TRACK.	
Rail, 15,842 tons, at $37.45	$593,283
Angle bars, 949 tons, at $58	55,042
Track bolts, 86 tons, at $74.85	6,437
Track spikes, 449 tons, at $63.60	28,556
Track ties, creosoted, 2,640 per mile, 443,520 pieces, at $1.05	465,696
Track laying, 168 miles, at $250	42,000

Surfacing 168 miles, at $50	8,400
Ballasting 168 miles, at $800	134,400
Sidings complete, 4 per cent length main line, 6.7 miles, at $9,785	65,559
Telegraph line 168 miles, at $170	28,560
Water service, 11 stations complete, at $2,000	22,000
Total	3,367,036

MANILA TO BATANGAS.

Route.—From Manila the line should pass through or near Pineda, Muntinlupa, Biñang, Santa Rosa, and Calamba, skirting the west shore of Laguna de Bay between Muntinlupa and Calamba. Leaving the lake shore at Calamba, line should cross Rio San Juan and then follow up the right bank through or near Santo Tomas, Tanáuan, Lipa, and San José to Batangas, crossing the San Juan River the second time at Tanáuan. Line as recommended is shown on map by broken lines. An alternative location, shown by dotted line on map, leaves line at Calamba and follows left bank of San Juan River, passing to the west of Santo Tomas and Tanáuan to a junction a few miles south of Tanáuan, thus avoiding two crossings of the San Juan River.

Grade.—Maximum will be 1½ per cent compensated.

Curvature.—Maximum will be 6° or 955.4 feet radius.

Transportation.—From Manila to Muntinlupa there is at present only a trail, but a wagon road could easily be built. From Muntinlupa to Batangas there is a splendid metaled road, which in no place is more than 2 miles from the proposed railway location. Material and supplies can also come in by sea at Batangas.

Traffic.—The section of country tributary to proposed line has suffered heavily from war, pestilence, etc., but is well settled, and should soon be in a prosperous condition. The flat lands along Laguna de Bay are rich, and both rice and sugar-cane produce well. Sugar mills are nearly all in ruins, and lands formerly devoted to sugar are covered with weeds and brush. Some land here is under irrigation, and will produce a dry-season crop of rice. From Calamba to Batangas the soil is a brown loam with some sand, and is 4 or 5 feet thick. Between Calamba and Santo Tomas is a good sugar country, but at present mills are in ruins and fields uncultivated. Between Santo Tomas and Batangas much coffee was formerly grown, between $2,000,000 and $3,000,000 worth in silver being sent out from the town of Lipa alone each year. An insect is said to have destroyed the trees several years ago. Planters are now talking of replanting. Some sugar is grown in the Lipa district. Taken as a business proposition this line is considered as having the best prospects of the three proposed, and should be a paying property from the day it is put in operation. There is little to fear from water transportation via river and lake in competition between Manila and Calamba, as the shores of the lake are so shallow that cargoes have to be lightered a mile in small boats.

Estimate, Manila to Batangas.
(69 miles.)

	United States currency.
General officers and heads of departments, except engineering, 69 miles, at $465	$32,085
Location, 69 miles, at $84	5,796
Right of way, including damage to houses, 69 miles, at $70	4,830
Clearing and grubbing, 69 miles, at $25	1,725
Engineering expense during construction, 69 miles, at $126	8,694
GRADING	
Manila to 2 miles north Muntinlupa, 140,000 cubic yards earth, at 25 cents	35,000
Thence to Muntinlupa, 35,000 cubic yards earth, at 25 cents	8,750
Thence to Muntinlupa, 21,000 cubic yards solid rock, at 85 cents	17,850
Muntinlupa to Calamba, 155,000 cubic yards earth at 25 cents	38,750
Calamba to 1 mile, north of Santo Tomas, 136,000 cubic yards earth, at 25 cents	34,000
Thence to Santo Tomas, 36,900 cubic yards earth, at 25 cents	9,225
Thence to Santo Tomas, 4,100 cubic yards solid rock, at 85 cents	3,485
Santo Tomas to Lipa Summit, 126,000 cubic yards earth, at 25 cents	31,500
Lipa Summit to Batangas, 414,000 cubic yards earth, at 25 cents	103,500
Ditching, 69 miles, at 300 cubic yards per mile, 20,700 cubic yards earth, at 25 cents	5,175
BRIDGING.	
Masonry, 16,223 cubic yards, at $7	113,561
Excavation for masonry, 8110 cubic yards, at 50 cents	4,055
Creosoted timber trestle, 96 spans, 15 feet each, at $157.15	15,086
Steel bridges in place, 387 tons, at $126.90	49,110
Creosoted timber deck for steel bridges, 670 linear feet, at $167.74 per 100 feet	1,124
TRACK.	
Rail, 6,507 tons, at $35.75	232,625
Angle bars, 390 tons, at $56.25	21,937
Track bolts, 35 tons, at $73.15	2,560
Track spikes, 184 tons, at $61.90	11,390
Track ties, 182,160 pieces, at $1	182,160
Track laying, 69 miles, at $250	17,250
Surfacing, 69 miles, at $50	3,450
Ballasting, 69 miles, at $800	55,200
Sidings, complete, 4 per cent of length of main line, 2.8 miles, at $9,480	26,544
Telegraph line, 69 miles, at $160	11,040
Water service, 5 stations complete, at $2,000	10,000
Total	1,097,457

NORTH COAST LINE.

Reconnaissance was made via this route from Aparri to Laoag. Line from Aparri west could be built very cheaply as far as Claveria, probably not more than $12,000 per mile. A line beyond Claveria, however, would be almost impracticable on account of the huge cost of the first 20 miles. The mountains rise from the sea for almost the entire distance, and many points are so narrow and precipitous that tunnels would be needed. This line is considered entirely out of the question, as its cost for grading alone would be $150,000 per mile, or more. If at any time in the future a line is desired across the island from east to west, the most feasible route would be up the Rio Chico de Cagayan to its head, thence across to the headwaters of the Abra River, and so down to Vigan on the west coast.

SAN NICOLAS PASS.

It was hoped this pass would prove to be enough easier than the Caravallo to warrant diverting the Manila-Aparri line thereto, but the reverse is the case, as it would require a longer tunnel than the Caraballo. The approaching southern valley is narrow and badly cut up with ravines. Did not go to the summit of the pass, but far enough up to make sure of the foregoing facts. Estimated height of pass, 4,000 feet above sea level.

FOLLOWING APPLIES TO ALL LINES.

Labor.—This is by far the most important question in connection with the construction of railways. The average native laborer of Luzon does not take kindly to any sort of work except planting and harvesting rice and fishing. An increase in rate of wages does not stimulate him to earn more money, but to put in less time. He is averse to hard manual labor and to working regular hours under direction of a foreman. The labor supply has been reduced by war and pestilence, and what exists is composed of men that are undersized and weak as compared with the laborer of other countries. There is no possibility of building the proposed lines of railway or any of them within a reasonable length of time except by the importation of Chinese or other foreign labor. A measure that would aid to some extent would be the passage of a law requiring all able-bodied men residing within a given distance of proposed lines to work a certain number of days per month or year on their construction, receiving a fair wage for so doing. Some of the government railways of Central America were largely built by laborers of this class, and there was a constantly increasing number of them who remained voluntarily on the works after having served their allotted time. Estimates have been based upon the completion of the three lines within three years after commencement of actual construction, which will undoubtedly require foreign labor. Without such labor the prices given will not apply, as dragging the construction over five or ten years of time would so largely increase the administrative expense and interest charges.

Masonry.—Estimates have been made for masonry culverts and bridge foundations laid with cement mortar. Where stone is not to be had within reasonable distance, concrete can usually be made of river gravel. In some places, where neither can be obtained within reasonable distance, it might pay to burn brick.

Bridges.—Timber trestles should be used wherever circumstances will permit and steel bridges only where absolutely necessary. Trestles should be of creosoted timber throughout, piles impregnated with 14 and other timber with 10 pounds to the cubic foot. Estimate has been made on this basis. Native timber is not to be had near any of the lines except at the Caraballo Pass, on the Manila-Aparri line. Creosoted timber from American Pacific coast ports will probably be found cheaper than native hard woods, and native soft woods are out of the question, except for temporary false work, where they might be used to advantage when procurable.

Track and roadbed.—Estimate has been made for standard gauge of 4 feet 8½ inches, 60-pound steel rail with 2-foot angle-bar joints, and roadbed of 16 feet on fills and 20 feet on cutting.

Ties.—Track ties should be 8 feet 6 inches long and 7 by 9 inches in section. Bridge ties should be 10 feet long and 8 by 8 inches in section. Both should be creosoted with 10 pounds to the cubic foot to withstand climate and insects. Ties from American Pacific coast ports are recommended. Estimate has been made on foregoing basis. Native hard-wood ties might be better, but would cost more, even if the labor to cut and get them out in time were to be had, which is hardly possible. There is a possibility that it might be better to import Australian hard-wood ties, but can not give price on them.

In computing cost of construction material it is assumed that all will enter free of customs charges.

All prices in this report and estimate refer to United States currency.

Mr. C. D. Drew, assistant chief engineer, has been a valuable assistant throughout, not only in collecting data in the field, but in preparing report and estimates. If any credit is due for the manner in which work has been done he is entitled to a full share in same.

Respectfully submitted.

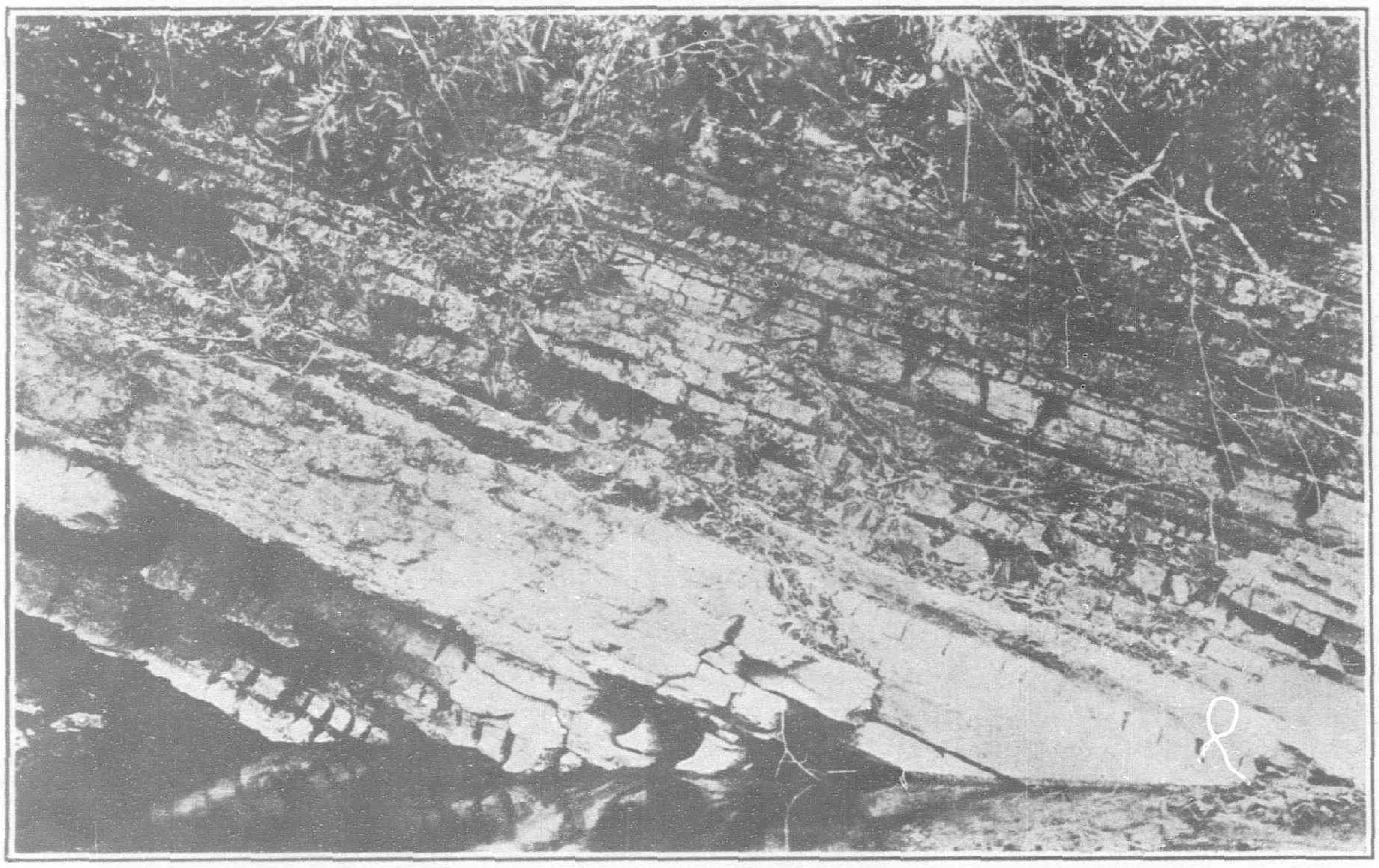
J. T. NORTON,
Chief Civil Engineer.

PEARLING IN MERGUI

The pearling season in Mergui, which extends from September to the middle of May, has just come to a close. Owners are busy negotiating for the sale of their pearls with Bombay and Straits merchants. The best pearls, however, are sent to Europe, where they have a better market, together with all the mother-of-pearl and other shells obtained. The season on the whole has been a profitable one for the pearlers, although no pearls of very extraordinary value were obtained, similar to those that were obtained last season and sold from Rs. 25,000 to Rs. 50,000 each. Pearling is essentially a speculation, and owners engage in it year after year only in the patient hope of some lucky day picking up a shell with the much coveted gem; and then their fortune is made and they retire from the business. In the meantime the shells in which the gem is occasionally found are gathered in abundance and bring in a sufficient return for the outlay on boats, crew, divers and diving apparatus; so there is never a loss.

IRON REGION OF ANGAT

By H. D. McCASKEY, B. S., Chief of Mining Bureau.



LIMESTONE BEDS. BAYABAS RIVER ABOVE SANTA MARGARITA SPRING. NEARER VIEW.

(Concluded.)

The accompanying table shows the results of analyses of iron ores of the Angat district, made for me by Mr. Paul Stangl, of the Bureau of Government Laboratories. Reducing the iron determinations to metallic iron by the use of appropriate factors from Fresenius, and adding the respective products, we find:

Total metallic iron.

	Per cent.
No. 1	63.31
No. 3	51.85
No. 4	59.24
No. 5 A	44.16
No. 5 B	60.95

In the above table I have included the iron represented as di-sulphide. Omitting this amount of iron, and retaining that from the oxides only, we find:

Metallic iron.

	Per cent.
No. 1	63.31
No. 3	50.10
No. 4	59.24
No. 5 A	37.33
No. 5 B	60.95

It will be observed that No. 1, No. 4, and No. 5 B are ores singularly rich and pure. No. 1 and No. 5 B are practically free from sulphur and phosphorus, those two most objectionable elements, and all three would suggest themselves as suitable for manufacture into high grade steel by the Bessemer process. The chief impurities are silica and alumina, but these can in no way impair the quality of steel made from them. Extensive tables will be prepared at some future date showing how well these three ores compare with those of other parts of the world. For the present I respectfully refer the reader to tabulated analyses published in the engineering journals, in the text-books on the metallurgy of iron and steel, and in the valuable publications of the United States Geological Survey and those of the Surveys of the mining States. In passing, I call attention to the remarkable absence of manganese from all of these Angat ores, and to the presence of cobalt in No. 3.

The above ores as sampled by me were *not* picked specimens. In the table following, in which are given the results of a series of assays made in the laboratory of this Bureau in the days of the Spanish Inspección de Minas, it will be noticed that the metallic iron runs higher than in the analyses by Mr. Stangl. This was probably because the ores were sampled from the piles ready for the smelter rather than from the face of the exposure; but of the facts in the case I have no information. Unfortunately the results in metallic iron only are given.

The metallurgy of iron, as at present practiced in these Islands, is confined entirely to Bulacan. At the time of my visit to the iron mines of Angat but one furnace was in blast; and in describing the operation of this I shall describe the operations of all, for I could learn of no variation elsewhere in the province from the practice at the Suarez camarin. It gives me great pleasure to acknowledge here the many courtesies extended to me by Señor Mariano Suarez during my visits to his works. He fully answered all of my many questions and he assisted me in every manner in my measurements, and in the making of sketches and photographs. My facilities for the observation of a furnace in blast were made as complete by him as it was possible for them to be.

The buildings in which the smelting is done are constructed entirely of the products of the forests of the neighborhood. The posts and rafters are of trimmed trunks of trees, the pieces are secured in place by *bejuca*, or rattan, and the thatching is of *cogon* or of nipa—thus no metal of any kind is required, and the camarines are made with the bolo as the only tool. These primitive, but well ventilated, inexpensive, and apparently satisfactory structures are illustrated in sketches and photographs accompanying this report. The Constancia camarin was in process of construction during my survey, and it is here shown with the roof partly thatched. The custom in the hills is for the *maestro*, or smelter foreman, to assemble his assistants, and with them to clear and level the land selected for the smelter site, to dig the clay from the stream banks, bake it into bricks and from these to construct the furnaces, to cut the required pieces and erect and roof the camarin, to prepare the moulds, tuyeres, slag-pots, and blowers, to burn the charcoal and sort the ore, to keep the books and to pay the men, and finally to smelt the iron and send forth the finished product. From the uncleared forest to the column of *cargadores* bearing the plowshares and points to the market, the entire work is entrusted to the *maestro* and to his assistants. This small industry is a singularly independent one, and so far as I could learn the one requirement of the entire process beyond all that the forests, ore banks, and streams of these narrow mountain valleys could furnish, is a limited amount of boneblack used in coating the molds.

The camarin once constructed is divided roughly into three parts, as shown in the sketch. One side is given up to stalls, or little rooms, in which live the workmen and where are stored the supplies and the furnace products. Another side is divided into ore bins and charcoal bins. The main central space is open and is given over to the smelting proper. In the center of this space are the two furnaces, with bamboo platforms at the sides upon which the feeders stand, with the tapping holes and slag runways at the front, and with the blower or air compressor and the connecting clay tuyeres behind. Opposite the furnaces runs a row of molds, always placed in position for pouring immediately after the last castings have been dumped.

The furnaces are generally made of sun-baked fire clay, the material being obtained from the decomposition of the crystalline feldspathic rocks of the neighboring hillsides. In some cases the bricks are molded, and the furnace is built up of these. In others the furnace itself is molded as one piece, dried, and afterwards bound with rattan or iron. The thickness is so great that, notwithstanding the intense smelting heat on the hearth, the rattan, or *bejuca*, is not burned off. In building the furnace a rectangular space 6 by 8 inches is left above the blow and tap holes, and into these are inserted blocks of a very silicious rock, measuring 6 by 8 by 15 inches,

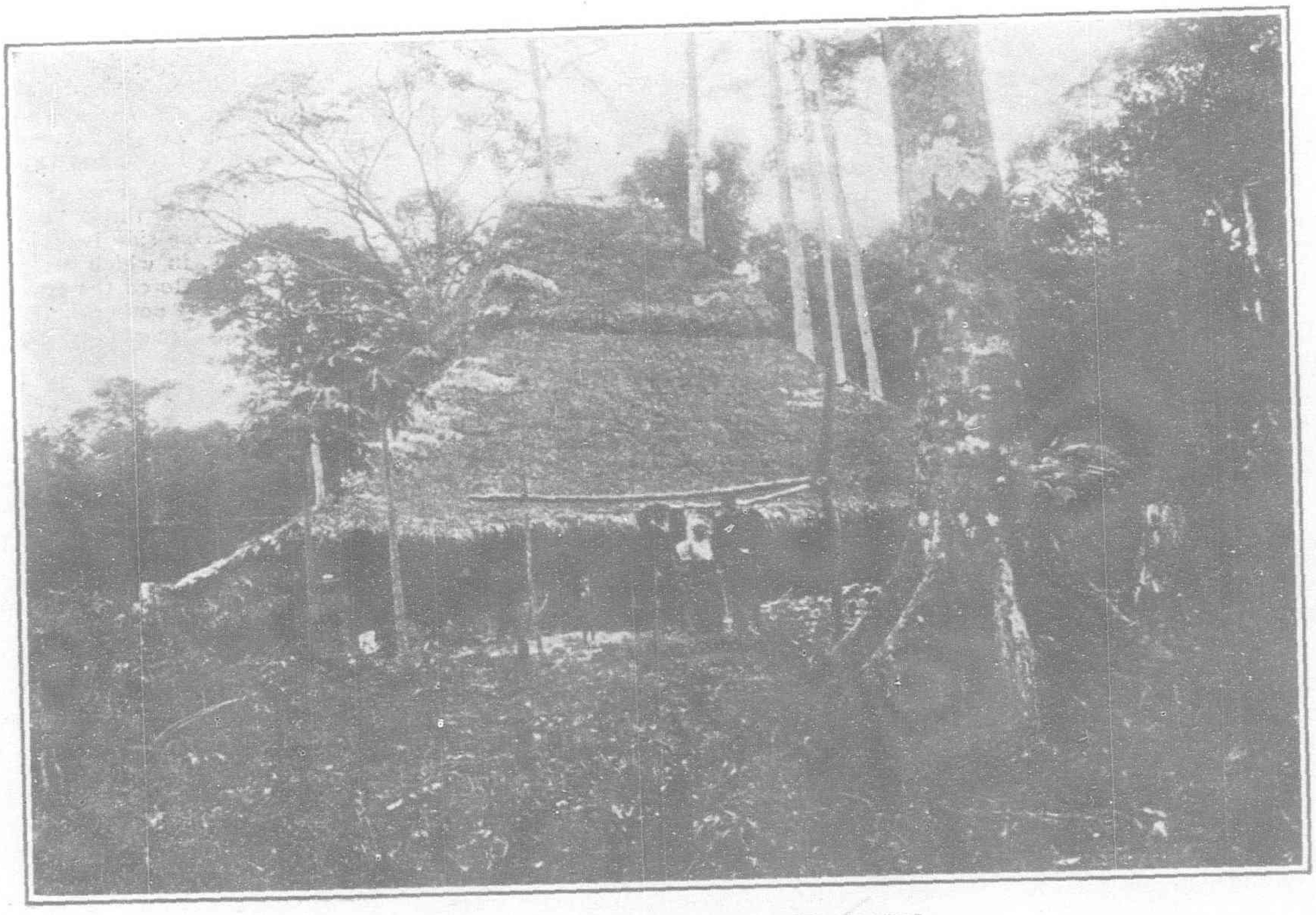
LA MESA BARRIO.

and called *buga* by the natives. The word *buga* is surely a misnomer, as it is the Tagalo for pumice. This quartzose rock is quarried near La Mesa for this especial purpose, and the ironmasters pay 2 pesos for each. They are used end about, and I imagine are for the sole purpose of furnishing silica to the slag. That they do furnish silica is shown by the ends of the blocks when removed.

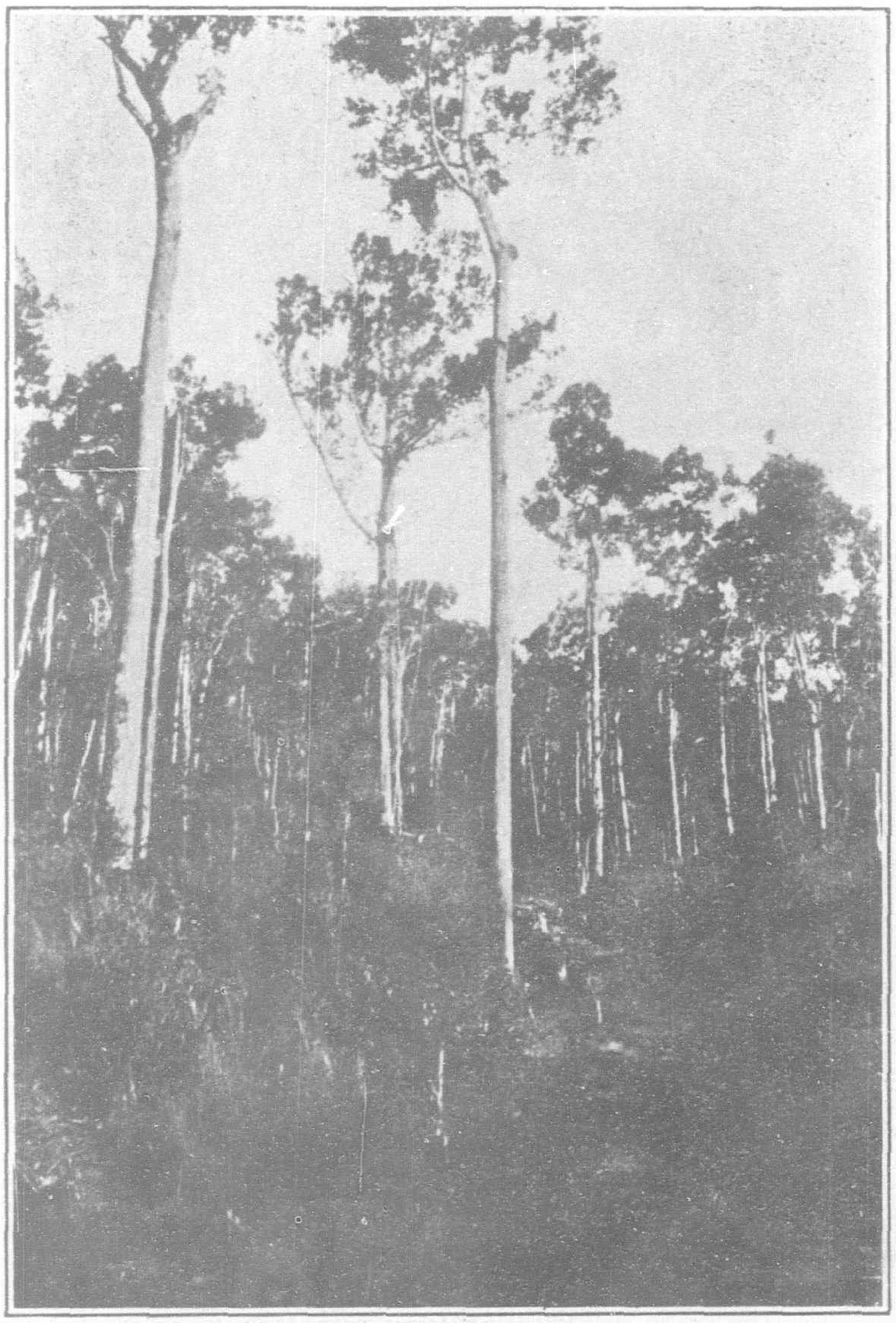
The hearth of the furnace is shallow and nearly circular. It is from 4 to 6 inches deep and about 2 feet 4 inches in diameter. The total height of the furnace is 7 feet 5 inches, measured from the ground, and the distance from bottom of hearth to top of furnace is 6 feet. The thickness of the annular ring formed by average right section is one foot, although this thickness is slightly greater toward the hearth.

The tuyere is a pipe of best selected and baked fire clay, connected with the blower at one end, passing through the furnace and opening upon the hearth at the other. It is 2 feet 7 inches long, 6 inches in gross diameter, and with an inner diameter of 1½ inches.

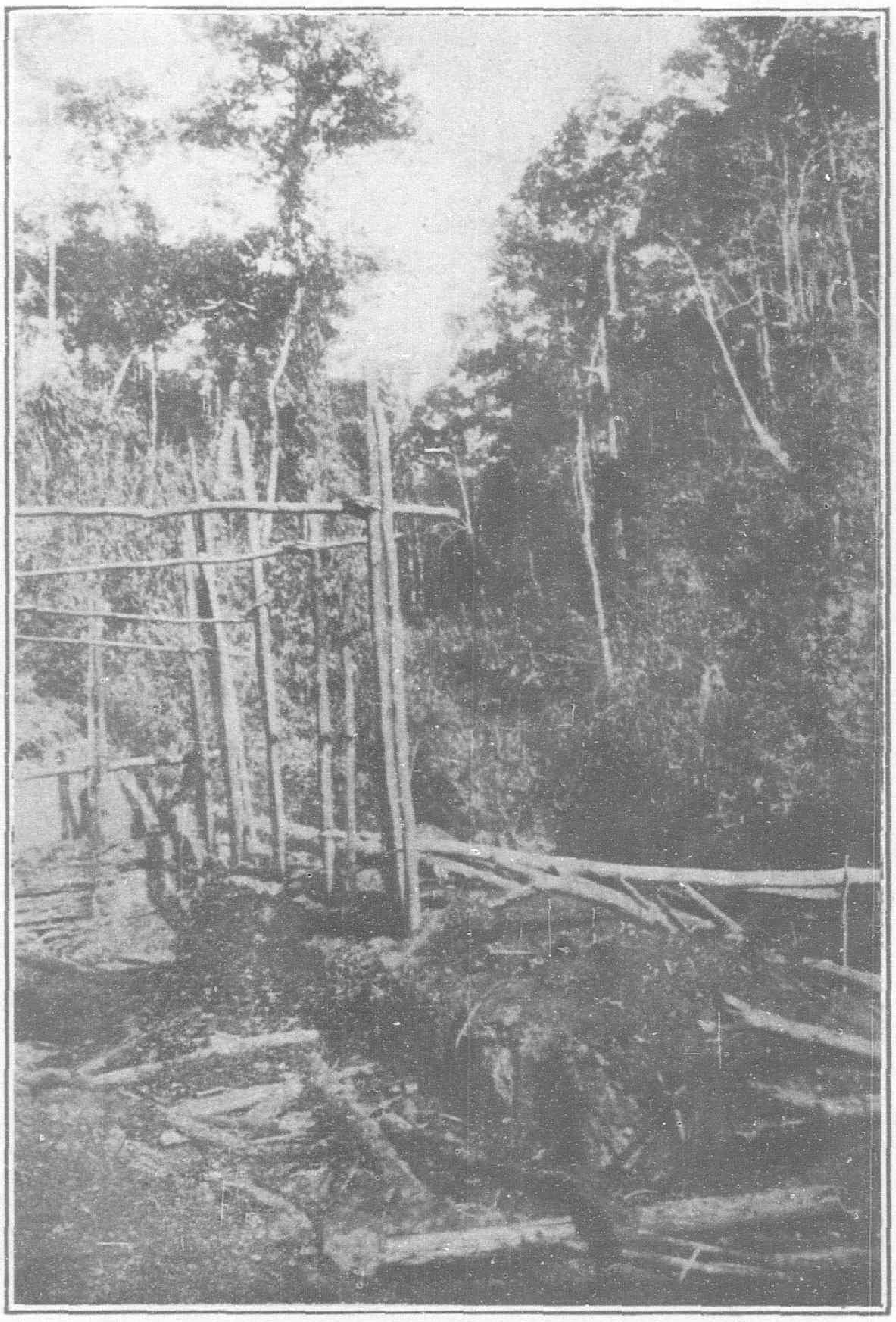
The air compressor, or blower, is as ingenious as it is interesting. It is made from the hollowed cylindrical trunk of a *tanguile* tree and is 9 feet 8 inches long and 1 foot 7 inches in its greatest diameter. One end of this blower rests upon the ground and the other is supported 1 foot 6 inches from the ground by a cross piece of wood. The ends of the blower are furnished with semi-circular valves of leather and wood, suspended from above and closing by the pressure of air against them when the piston moves toward them. The valves are 3½ inches by 7 inches. A separate piece of wood, containing the compart-



SANTIAGO CAMARIN ON CONSTANCIA CLAIMS.



TRAIL ON MOUNT CALABAZA LEADING INTO FOREST.



PREPARATIONS FOR CHARCOAL BURNING. SUAREZ CAMARIN.

ment into which the air is forced and from which it is driven through the tuyere into the furnace, is fitted into the main blower, and made air-tight. It contains an opening at each end into the compressor. The connection between the tuyere and the air compartment is frequently a short piece of cast-iron pipe fitted tight. The piston is a circular piece of wood well fitted and carrying around its perimeter a double thickness of feathers. The piston rod is of *balite* wood, 15 feet long and furnished with a double handle.

The molds for the present smelter practice are of two shapes, and of different sizes for the large, medium, and small castings. These molds are made of carefully selected and ground clay and the bottom halves are "formed" by means of pieces of *narra* wood cut to the shapes and sizes of the castings desired. The inner surfaces are freshly coated for each casting with a paint made of a mixture of boneblack, ground *palay*, and water. The halves of the molds are placed in wooden frames, bound close together with rattan, and set upon a pair of forked sticks for the pouring.

The ore baskets used in feeding the furnace are wedge-shaped and are 1 foot 4 inches long, 1 foot 2 inches wide, and 6 inches at the back. The flat baskets used in feeding the charcoal are circular and 2 feet in diameter and 5½ inches high.

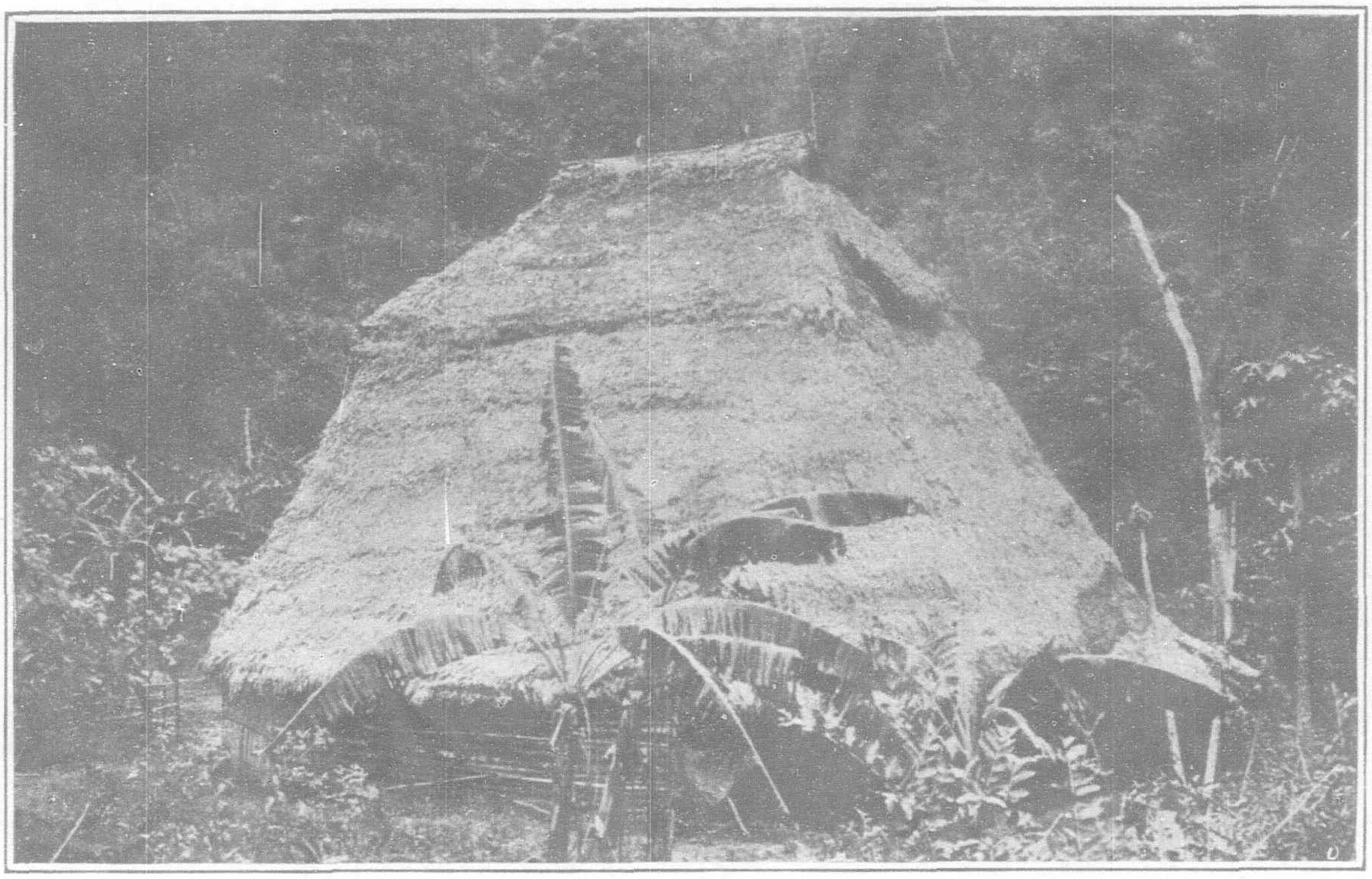
The pouring pot, or ladle, is made of fire clay, bound with iron and furnished with a stout wooden handle. Its inner dimensions are about 8 inches and 6 inches for the larger and smaller diameters, respectively, and 6 inches deep. The few tools, such as pokers, stirring rods for the furnace, and ore hammers and picks for the ore beds, are of wrought iron.

The ore beds are worked, as I have already mentioned, in the open and in the most primitive manner. No system whatever is followed, save the very rudest methods of "stripping" and quarrying. The ore being broken down by means of crowbars, picks, and small sledge hammers, is carefully hand sorted and carried by cargadores to the smelter. Here it is reduced to a uniform size of about 1½ by 1½ by 1½ inches by means of a small cube-shaped hammer having four breaking edges.

The charcoal is burned near by, by the smelter men, who cut the forest trees of the third, fourth, and fifth groups for the purpose. They make an excellent quality of well burned charcoal, and to this valuable fuel much of the success of the native smelters is due.

Before "blowing in" a furnace the hearth and body are filled with glowing fuel, the air driven through, and the furnace well and evenly dried and heated. This being accomplished, the ore and fuel are introduced alternately, the proportion for the preliminary stage being one-half an ore-basket, as above described, of metal, to four full charcoal baskets of fuel. After the furnace is well heated, the iron reduced and running upon the hearth, and the blast well on, the normal proportion is thereafter fed to the furnace of one full basket of ore to four of charcoal, and the furnace is kept filled, with a cone of heaped charcoal on top. (In one of the small photographs accompanying this report I have attempted to show the native *maestro* with his one empty ore basket and the four charcoal baskets.) The air compressor is worked at an average rate of 17 strokes per minute, and the pressure and volume seem ample for the purpose. The process of reduction is comparatively simple as the ore is self-fluxing and the fuel is very pure, there being no fluxes required whatever, save that from the *buga* rock above mentioned. This reduction is caused by the carbon monoxide which is itself produced by the carbon di-oxide of the burning fuel coming into contact with the hot charcoal.

The slagging of the silica and alumina with a certain proportion of the iron is rapidly formed and *escoradores* draw off the slag every two or three minutes when the furnace is working well. The pourings are made every two or three hours. The pouring pot is filled, and the *maestro* passes down the line of molds, with the pot of molten metal upon which floats a cover of burning charcoal; and he rapidly fills mold after mold. The remaining metal is returned to the hearth. As rapidly as the castings harden in the molds the latter are taken down and opened, the castings thrown out, and the surfaces of the molds are relined with paint and prepared for another pouring. About 15 molds are in constant use



THE OTAYCO CAMARIN.

by one furnace in good running order, 8 of these for plowshares and 7 for points.

The finished product, as made at present in the smelters, is of the largest size only of plowshares and points. These are exhibited in various positions in photographs accompanying this report; and I have attempted a sketch in which are shown the use of the parts on the Filipino plow. The plowshare of this largest size weighs 4 9-10 pounds. The castings are only fairly good in quality and might be greatly improved.

The expenses and profits of this industry are too variable to be readily ascertained. During the plowing months, May and June, the pair, which consists of a plowshare and a point, bring 1 peso, and the Angat people buy the entire product. During the other months a large part of the product is sent to Manila and is sold here at the rate of from 70 to 90 pesos per hundred pairs. The costs of transportation are variable. Señor Suarez pays the cargadores one real for each pair carried from the smelter to Angat, and as each averages about eight pairs he makes 8 reals or 1 peso for the round trip of about 15 miles. When the roads are good it costs 4½ pesos to get 100 pairs to Manila; when they are bad, as in the rainy season, it costs 7 pesos. Because of the shortage of labor, at the wages Señor Suarez can afford to pay, he informed me that he can not get enough men to keep even one furnace in blast. He said that he would work three furnaces if he could get the men. During my visit he complained that we Americans overpaid native labor throughout the Islands and that native employers with limited plants could not compete for labor. As it is he must blow out his furnace from time to time to put his limited force to cutting timber for charcoal, to the making of molds, tuyeres, and other supplies, and to general repair work. He estimated four months' smelting a year as good, that is, producing from 2,000 to 3,000 pairs each

PREPARATION FOR CHARCOAL BURNING. SUAREZ CAMARIN.

month, four months, as medium, or producing from 1,500 to 2,000 pairs, and four months, during which time the furnace is largely out of blast, as poor, or producing from 800 to 1,000 pairs.

The laborers required for one furnace are almost as many as for two and are 2 *maestros* or foremen, who have general charge, 1 *escribiente*, or clerk, 2 *escoradores*, or slagmen, who also act as *brajenantes*, or molders, 4 *heladores*, or blowers, and from 4 to 7 other common laborers who obtain and prepare the ore and fuel. These men are "found" and are paid by the amount produced, the unit being 60 carabao loads of 20 pairs each. Señor Suarez told me that the food he gave the men depended upon the quantity and quality of their work, and that when everything was running well and the output steady and large he fed them with the best he could buy. He estimated that the cost to him in food and wages, for men enough for one furnace, averaged about 60 pesos a month during the working season, or about 40 pesos through the year, and that the variation was between 20 and 100 pesos. His annual taxes during the Spanish régime were 115 pesos to the General Government and 48 pesos to the pueblo of Angat. He seemed much concerned over the cost that his fuel would be to him under the present Forestry Regulations. He stated that he cut only the cheaper grades of trees for charcoal, and yet, upon looking over the taxes imposed at the present scale, he said that he would be compelled to shut down if he were forced to pay the full amount. I could get no statistics whatever upon this subject of the cost of his fuel, and this is a matter of regret to me, because it is a most essential factor in the operation of furnaces in this region upon a larger scale.

With the above incomplete data I have attempted to form some sort of estimate of the profits of one furnace, run under unfavorable conditions. With more furnaces and improved methods the profits would correspondingly increase. One great difficulty in the attempt at an estimate is the division of product as to place of sale, the profits being greater when the plowshares are sold in Angat. The following is intended to be more suggestive than accurate:

Estimate of profits from one blast furnace.

	Mexican currency.
Sale of 6,000 pairs in Angat at $0.90	$5,400.00
Sale of 14,000 pairs in Manila at $0.75	10,500.00
Annual receipts	15,900.00
Transportation of 6,000 pairs to Angat at $0.12½	750.00
Transportation of 14,000 pairs to Manila at $0.70	9,800.00
Wages and food for employees for 20,000 pairs.	1,000.00
Taxes under Spanish régime	163.00
Annual expenditures	11,713.00
Annual profits	4,187.00

In the above no account has been taken of cost of mine and plant.

The latter, of course, costs very little indeed. There is, and has been, so much unfortunate litigation and quarreling over these mines and camarines, that no data on the subjects were obtainable.

It would seem that if a market could be assured for a large output of these plowshares and other castings, or of pig iron of high grade, if charcoal can be had at reasonable rates or if our Islands can furnish lignite of a quality to give good producer gas; if the transportation rates can be materially reduced, and if competent labor can be secured—that a large modern furnace smelting the best of these ores could operate at a handsome profit to its owners. I am inclined to think that the above conditions *can* be satisfactorily settled and that there *is* a future for the iron industry in the Philippines.

Herewith I give the only statistics available of iron production in Bulacan. The information is for the year 1884 and was furnished by the governor of Bulacan on February 4, 1886:

TILTED LIMESTONE BEDS. BAYABAS RIVER ACROSS THE STREAM FROM SANTA MARGARITA SPRING

Statistics of iron production in Bulacan, 1884.

Pueblos.	Number of furnaces.	Number of plowshares.	Number of operatives.
San Miguel	3	20,000	25
San Miguel	2	10,000	10
Angat	2	12,000	18
Angat	1	8,200	14
Angat	1	8,200	14
Total	9	58,400	81

Of the remaining factors in the mineral industry of Bulacan, unfortunately but little could be learned. This province has undoubtedly produced some placer gold in past years, but no statistics whatever are available. Some months ago a prospector showed me several ounces of rather coarse placer gold that he said came from the hills of Bulacan; but he offered no information whatever as to the location. This reticence at that time was of course most natural; there was then absolutely no legal protection whatever for these men in their finds. Several prospectors whom I met in Bulacan told me that they had washed the sands of many of the streams but had found nothing, excepting in the hills to the north of Norzagaray, where there was some placer gold. My guides frequently spoke of gold in the streams, but their descriptions were too vague to be of any worth. José Fajardo told me that a small *sapa*, or stream, emptying into the Angat just above the town of that name, carried gold, and that he had staked out several claims. He also said that the Sapa Apo, which was very indefinitely described, at one time carried a great deal of gold. And so there are rumors, and tales that are told; but of definite information there is nothing. The purposes of my survey were either unintentionally, or willfully, misunderstood by some of the American prospectors; and I therefore made it a point to confine myself to information that I could readily obtain without misunderstanding of any kind, knowing that professional prospectors are the best seekers after gold, and that their discoveries under the protection of mining laws would soon furnish the information desired. I fully expect to hear of discoveries of both placer and quartz claims in the upper hills of Bulacan.

Graphite pebbles were found by me in the bed of the Pangisijan Creek near Mount Tucod. No further evidences of a deposit were obtained, although I examined the headwaters rather carefully for them. Among the matemorphic rocks of the cordillera there probably exist deposits of this valuable mineral.

Lignite of a very inferior grade and in thin seams has been formed in the shales of Bulacan. I saw two of these seams, one at the barrio Sampaloc, in the shales exposed by the Bayabas, and one on the upper Sapa-Santol. They were absolutely valueless, neither being more than a few inches thick. An inferior lignite is also found in the arroyo Laguio Malaqui near Norzagaray. No coal mining has ever been done in this province, and no concessions for coal have ever been granted here. The importance of a good lignite in Bulacan capable of furnishing producer gas for future iron smelting can not be overestimated. In Rizal Province, under conditions similar somewhat to those in Bulacan an excellent gas-making coal has been discovered in quantity. It is possible that such deposits may yet be found under the coral limestone formations of Bulacan. It is notable, in this connection, that no valuable coal has yet been discovered in the mountains east of the plain of central Luzon, with the single exception of reported finds near Baler, on the Pacific coast.

Building stone of good grade and great beauty can be quarried from the crystalline rocks of the range. The tonalites, or the fine-grained quartz-diorites, and the aplite, would make handsome stones capable of receiving high polish. The development of this industry, however, must indefinitely await a demand for the stone and for better transportation facilities.

Vast quantities of limestone are available in Bulacan for use as road metal, as furnace flux, as building stone, and for the working of lime. The latter is the only purpose for which limestone is now used, and this branch of the mineral industry is practiced, as far as I could learn, at Banabang only, on the Bayabas River, near Angat. The range of hills, of which Mount Pecote is a prominent part, show extensive exposures of a fine-grained cream-colored limestone on their western slopes. This rock is not regularly quarried, but the large slabs and bowlders of the rock lying on the surface of the ground are broken, and carried to the kiln at Banabang, a half mile to the west. This limekiln is fired up only when there is a sufficient demand in Angat, or in some of the other towns, for several hundred pounds of lime. It is owned and operated, I was informed, by five natives, residents of Angat. These partners in the business do all the work of obtaining and hauling the stone and fuel, and of digging and puddling the clay required for building up the sides. There is therefore

THE "TRAIL" UP A BRANCH OF THE MAGN CREEK TO HISON MINE.

no expense for labor, and, as they pay nothing for either stone or clay, the expense account is practically that of the fuel. The native operators use dried bamboo stalks for fuel, and they say that by burning these they can obtain a hotter fire than with wood or charcoal. The stalks are cut in lengths of 4 feet and are piled like cord wood near the kiln. The unit of measurement and of payment is the "talacsan," which is 1 vara long, 1 vara high, and 4 feet wide. The requirement for one firing is 60 "talacsans" which cost 1 peso each. The average product of lime in one firing is 300 cavans, or about 640 bushels. The lime is of excellent grade and now sells in the towns for a peso a cavan, whereas in the days of the Spanish régime it brought but a peseta a cavan. Therefore for one firing, producing 300 cavans worth a peso each, the total cost of which amount is 60 pesos, the profit is evidently 300—60=240 pesos. This divided among five men yields 48 pesos each for 15 days of work. There is apparently a comfortable profit to the owners in this small business. The lime made by them is fine and white, and has a very good reputation in the towns and is in fair demand. It has not been used in agriculture so far as I could learn.

The process is of course a very simple one. The limestone or calcium carbonate being properly heated in a partially closed oven gives up its carbon-dioxide and remains as calcium-oxide. A sketch is shown herewith exhibiting the principal dimensions of the kiln. The body of the oven is below the surface of the ground, as is the firing box. The hole from which the lime is taken opens upon the bank of the stream just above the road, so that loading upon carts is readily facilitated. The red clay dug from the fields is puddled by foot. The slabs of stone are piled in the form of a hive with a hollow space within and with an opening into the firebox. When the arrangement is complete the outer surface is covered with straw for 3 or 4 inches and over this is carefully plastered the clay to the same thickness, with a series of holes through the shell for draft. The draw hole is then tamped with clay, the kiln is gradually heated, and finally the proper degree of heat is obtained and continued to the end of the operation. The draw hole is opened from time to time for the removal of the ashes. The firing requires eight days and nights of continuous attention, and the preparation for each burning requires seven days of labor. There were formerly two kilns in operation at Banabang, but at the time of my visit there was but one.

CONCLUSION.

Before concluding this report I wish to repeat my appreciation of the work of Mr. Martin, the photographer of the Bureau of Government Laboratories, whose photographs accompany this report. Mr. Martin's work speaks for itself, and it is a pleasure to record the fact that with him exist the combination of exceptional ability and devotion to the good of the public service.

Should the Government ever take steps toward the setting aside of certain public lands as parks, in order to preserve whatever unusual natural beauty may be found therein, I beg to call attention to the Puning Cave and that part of the valley of the Puning Creek immediately adjacent.

In summing up the geology of Bulacan I refer again to the fact that the crystalline massive rocks have been found in place in the cordillera, which fact confirms the hypothesis of Itier and von Drasche, and which settles a point apparently in doubt during the compilation of the "Geology of the Philippine Islands," by Prof. G. F. Becker, of the United States Geological Survey. I further call attention to the finding of a vegetable fossil, encased in a pebble in the stream bed of the Bayabas, which, I believe, is the oldest fossil in point of geological history yet discovered in the Philippines. It apparently points back to the early Mesozoic, possibly to the Paleozoic!

The mineral resources of the province have been as fully discussed as time and the data obtainable would permit. The interesting method of smelting the iron, which is over a century old, and the origin of which I have not ascertained, is fairly well illustrated by sketches and photographs.

For ready reference I have given lists of illustrations and photographs, and a skeleton index of the report.

In conclusion, I beg to express the hope that this preliminary field work may but be the first of many surveys and studies to be prosecuted by this Bureau; that the future work may be broadened, and its usefulness increased, by an added force to the personnel, so that with a division of labor a much greater amount of work can be performed; and that, finally, the earnest efforts to make the results of this first survey of value, may have so far been successful, that encouragement may result for extensive work in the future in the study and development of the mineral resources of the Philippine Islands. Capitalists are always willing to pay, and to pay well, for mines, quarries, or other mineral deposits that they know to be of worth; the discovery and development of these, fair and honest reports upon them, and inducements to capital to invest in them, will result in largely increased business in these Islands, in better transportation, in better wages, in a natural pride on the part of the natives in the value of the metallic wealth hidden in their hills, and finally in such an increase in industrial prosperity as could never have been known had not the capital and brains of the outside world been invoked to that happy end.

COAL AND SILVER MINE, CHINA

A special correspondent of the *N. C. Daily News*, writing from Hangchow, and referring to the Tungyang district, says: "In the latter district, a coal mine has for some years been worked in a small way by the natives. The mine constantly fills with water, however, and though a foreign pumping apparatus was procured a year or so ago, it has not proved satisfactory. I was approached one day while at Iu by a country man, who offered to sell me a hill which he said contained silver. I did not go to inspect it; but that there is silver in various parts of these two districts, there is no doubt."

DUFF DEVELOPMENT CO.

The Singapore agents, Messrs Paterson, Simons & Co., have received the following information from the Manager of the Duff Development Co. Ltd.:

"For the week ending 25th June, Dredger No. 1, which is only a small prospecting dredger, recovered 99¼ oz. of gold for a run of 131 hours, giving a profit of £346.11.2 on the week's run.

"The Dredger during the week treated 2,044 cubic yards, the value of the ground being 23.30 grs. per cubic yard. A dredger of the size of the one now under construction in Kelantan would have been able to treat say 8,000 cubic yards."

REDJANG LEBONG

Consul Fraser's report on Java, in reference to the topic of mining, has this:—

"The Redjang Lebong Mine in Sumatra was worked with success during the year, the gold and silver produced being valued at close on £150,000; and the accounts closed with a substantial cash balance. The funds in hand are now sufficient to pay off about £45,000 due to bondholders, or, in the event of their deciding to accept shares in place of cash, a dividend of 20 per cent. on nearly £200,000 paid-up capital. Although the working expenses are still heavy, the quality of the ore is very good and it is considered that the mine has a great future. With regard to the Netherlands Indian Mining Company, nothing definite has yet been settled as to what method of reconstruction will be adopted. Meantime, sufficient gold is being won to pay working expenses. Of other mining companies, the Ketahoen, whose property is situated close to Redjang Lebong, is the most important, while of the remainder the Kahayan in South Borneo, and Totok in North Celebes, show promise.

KELANTAN GOLD DREDGING

(No. 1) Company, Ltd.

The Duff Development Company, which holds a large concession for 40 years from the Rajah of Kelantan, is forming its first subsidiary Company under the above title. The capital is £180,000, of which £80,000 has been already under-written as working capital. The Company is to work five and a half miles of the Galas or Kelantan river bed by dredging, and to-day we have from the Duff Development Company's agents a statement of what is a very satisfactory week's out-put from a small dredger now on the river.

SHANTUNG MINES

It is perhaps not generally known that besides the Shantung Railway Company, with its rights to mining on both sides of its line, there is a separate Shantung Mining Company, a German Company, opening mines in various parts of the province.

Silver.

The writer has just visited the mines in Anch'iu and Ch'anglo, which are under the management of Mr. Vorschulte. Being unaware of the presence of foreigners in that neighborhood, it was a strange experience to come on a huge steel tower erected on a bare hillside, and to find a gang of coolies working a drill which had already gone down about 500 feet. This was in southern Ch'anglo. Ten miles farther south, Mr. Vorschulte in Anch'iu was honeycombing sundry small hills and tapping half-a-dozen veins of silver. The work is only in the experimental stage, but already there are about 1,300 feet of horizontal tunnelling in the solid rock, besides over 600 feet of shafts in various spots. The rocks are called porphyry in German terminology, and may be what we term andesites, and are probably of the Permian age. The veins are but little inclined from the vertical and the gangue is barytes and fluorite. How rich the ores may be is not known until the proper analyses have been completed.

Coal.

In the Ch'anglo district coal was the object looked for, and, as already stated, drilling had gone on, on one hillside, through some 500 feet of volcanic conglomerate. But on a neighboring hill a shaft had been sunk of about 130 feet, at which depth a horizontal tunnel of only some 20 yards in length struck a vertical seam of good coal. The discovery of the seam happened exactly in the hour of my arrival, and I was heartily glad to join in the rejoicing of the three or four Germans whose labor was thus rewarded. Between the coal seam and the mineral lodes it looked to me as though it must be worth running a branch line from Fangtze or from Weihsien, some 30 miles, and the district may then become busy and prosperous.

Old Workings.

There was one exceedingly interesting fact to be noted: in the search both for the metals and the coal the seekers were guided by old Chinese workings. Shafts had been sunk along the lines of several veins, and the ores extracted to the depth of 80 or 100 feet. A poor seam of coal (they missed the good one) had been worked to over 150 feet deep! This took place apparently towards the close of the last dynasty, say 300 years ago, and various tools of those times were picked up in the old workings.

One was pleased to remark that the attitude of the people in this back country was unmistakably peaceful, which would indicate that the Germans there have not only been energetic and enterprising, but also judicious and tactful in their treatment of the natives.—*Special Correspondence of N. C. Herald.*

PAHANG-KABANG, LTD.

The Pahang-Kabang, Ltd., report to Dec. 31, 1903, states that during the 12 months 8,530 tons of ore were crushed for a yield of 136½ tons of black tin, or 1.6 per cent., against 7,150 tons crushed in 1902, which yielded 96½ tons of black tin, averaging 1.3 per cent. In 1901 the sales of tin amounted to only 39 tons, and the steady increase effected in the face of much sickness among the coolies, a difficulty in obtaining adequate or effective labor and other adverse circumstances, may be considered satisfactory, and a good augury for the future development. After charging all working costs, the London and Singapore expenses, and a considerable portion of the cost of development against the returns, a profit of £2,674 remains on the year's work. Over two-thirds of this profit was earned during the last six months, though the battery was only running 147 days, from July to December, against 177 days, from January to June. The ore treated during the year was all obtained from Fraser's Mine, where the lode has not only continued to open up of large size, but as the workings have been extended in depth the quality has shown a decided improvement. In view of the size and steady improvement in quality of the lode, the Board now have under consideration the question of the erection of a battery there. A site which appears to be admirably adapted in all respects for the erection of a large mill has been located by the superintendent, who reports that "the ground lends itself naturally in every way to the requirements of a modern mill of large size, designed in such a manner as to reduce handling to a minimum by gravitation methods."

CHINA'S MINERAL RESOURCES

It is reported that the Government at Peking has instructed the Viceroys of the different provinces to make a thorough survey of the mineral resources of their respective provinces, and to submit their reports, together with plans and full particulars, of the mineral deposits.

After the perusal of the reports by the Empress Dowager, they will be handed over to the Board of Commerce for reference and future guidance in the consideration and recommendation of applications for mining concessions.

It is hoped that this scheme will prevent delay, bribery, and squeezing by the provincial officials.

LABUAN COALFIELDS, LTD.

The report of the Labuan Coalfields to Dec. 31 last states that £26,898 was paid for the property in Labuan, including solicitors' costs, stamp duty, etc., £1,377 of this amount, being in payment for stores, was transferred to stores account. Since work was begun by the company £9,921 has been spent on new machinery, plant, and rolling stock, including freight from London, and £8,537 has been expended in Labuan on developments, including wages, erection of machinery, buildings, etc. From this amount £2,100 has been written off against management charges, being the balance of proceeds, over and above the actual cost of winning, of 17,455 tons of coal sold during the year. The directors trust that the remaining funds will be sufficient to bring the mine into a paying position, and Mr. Hopwood is doing all he can to push on the work with this end in view. The rainy season has been very severe, and has much hindered work. The directors, from their experience of Mr. Hopwood's management, have full reliance on his being able to carry out his plans thoroughly well.

THE RAUB MINE

The General Manager's report for the month ending 18th June, 1904, runs as follows:—

The mine measurements and assay results of prospecting work, prepared by the mine manager, show a total of 233 ft. for the period (4 weeks) under review, made up of 9 ft. sinking, 136 ft. driving, and 88 ft. crossscutting, as against a total of 314 ft. for the previous four weeks.

PLANT AND MACHINERY

The electric pumping gear for Koman shaft is now complete, but for connecting to the main cable. This will be done at once, and a trial run will take place in a few days.

The ten-inch steam pump has been taken out of the shaft, and the fixing of the new water column and pump rods is in hand. To do this it has been necessary to suspend the sinking of the shaft, and to remove the whole of the old gear. The smallness of the shaft has rendered progress very slow. The water at the No. 3 and No. 4 levels is being kept out by the eight-inch and six-inch steam-pumps that are fixed on cisterns in those stations.

Milling Return for 4 weeks ending 18th June, 1904.

Stamps working:—40.

Period of work:—28 days, less lost time, 5.39 days (129 hours, 30 minutes), nearly all due to stoppages required to replace broken camshafts, etc.

Ore milled:—Koman, 2,704 tons; also 70 tons old blanketings milled for cyaniding.

Mill duty:—3.08 tons per stamp per 24 hours.

Amalgam yield:—445.35 oz. melted gold—30.13%.

Bullion yield per ton:—3.21 dwt.—71.18% contents.

Bullion fineness:—average 923.7.

Mercury loss:—2.7 lbs. per 100 tons milled=2.44 oz. per oz. bullion.

Tailings assays:—1.3 dwt.=28.82 % contents.

Remarks:—We have now completed the new equipment of the battery—new camshafts, cams, pulleys, stems, tappets, and bosses throughout.

Estimated cost sheet—4 weeks ending 18th June, 1904:

European Salaries.—			$4,941	50
Wages	Development	$608 00		
	Ore raising	5,104 12		
	Surface	3,712 20	9,424	32
Timber, fuel and charcoal			1,642	31
Royalty			441	45
Sundries			865	19
Stores			2,573	18
			$19,887	95

Expenditure on capital acct.

Plant and machinery,	Koman	$8,899	36
do	Cyanide	679	80
do	Sempam	943	27
do	Mill	2,660	80
Development …… …… ……		916	81
Furniture …… …… …… ……		339	68
Buildings …… …… …… ……		131	12
New Main Shaft …… …… ……		33,546	16

C. G. Warnford Lock,
Gen. Manager.

NORTH BORNEO

The *British North Borneo Herald* makes much of rich deposits of manganese found in Marudu Bay. Regular shipments of it are shortly expected to follow. Chromite, too, has been discovered in Marudu Bay, as well as iron ore. Samples of this ore assayed show a yield of 94%. Sandakan, which lies close by, is expected to profit hugely by these finds. Only 200 miles away are promising coal beds now under development at Cowie Harbor. Hopes run high that ere long a great steel industry will shortly arise in that quarter.

Tientsin is expecting cheap coal next winter from a mine in Shansi belonging to Messrs. Telge and Schroeter, Mr. Binks having struck a good 4-foot seam at a depth of 300 feet.

MINING IN SOUTH BURMA

LEAD AND MARBLE.

The *Rangoon Gazette* takes note that the mining industry is going ahead in Mergui. The mining industries are going ahead, and what promises to be a profitable discovery of a large bed of lead sulphide ore has very lately been made by Mr. Snow, the Mining Engineer of the Burma Development Syndicate, on the Maingay Island, near Mergui. He succeeded in tracing a 16-foot from the sea-shore up to the top of the hill, a distance of about half a mile, and rich carbonate ore now lies exposed all along this bed. The Syndicate has the mining lease of the island; and as there is an abundant supply of water for cleansing purposes in the locality, and the beach has its advantages for shipping the ore when obtained, large shipments have already been made to Liverpool for smelting, and more are in transit. The district is noted for its minerals, but it is not generally known that we have also an island about sixty miles from Mergui, known as the Marble Isle, on which pure white marble rocks are to be found in abundance. The existence of marble in that locality has been known for years past, but it does not appear whether it was owing to the lack of enterprising speculators or to the disadvantages of transport from the island that the industry, which should be a profitable one, has so long remained latent, and that we have not heard more of white marble from Mergui. The Victoria Memorial Hall to be built in Calcutta, in which white marble worth several lacks of rupees will be required, has given this matter an impetus.

TIN AT PORT DARWIN

A remarkable discovery of tin has been reported at Port Darwin. Very little has been heard regarding the discovery, but the show is said to be owned by two half-caste Chinamen named Hong Gong. The tin had been found some distance from Port Darwin, and the field promises to be very rich. It was estimated that there was already £30,000 worth of alluvial ore in sight, and this could be shipped at comparatively small cost. The China Steam Navigation Company's steamer *Tsinan* lately took away from Port Darwin 60 tons of tin ore, consigned to Sydney, which was said to be 75 per cent pure tin, and is worth about £80 per ton. It is stated that the whole of this tin had been taken from an area of ground not covering more than about 25 yards by 15 or 20 yards, which has been worked down to a uniform depth of about 4ft., and has proved rich in tin from the surface downwards. This open cut-working is on the slope of a hillock, immediately below an outcrop of white quartz, thickly studded with tin ore, which appears above the surface about twenty-five yards from the summit of the hillock.

PAHANG-KABANG, LTD.

Shareholders in the Pahang-Kabang have had to possess their souls in patience for a good many years, but according to report they are on a fair way to be recompensed, as the directors are persuaded that the mine in operation is one of proved value, and that the property will be gradually brought to a paying state. There have undoubtedly been great hindrances, but there are certainly indications of improving results. Thus, in 1901, the sales of tin only amounted to 39 tons, in 1902 96½ tons were sold, and in 1903 the product available for marketing was 136½ tons. It is, moreover, encouraging that, whilst the production of stone crushed was greater by 1340 tons in 1903 than in 1902, the percentage of tin yielded by Fraser's lode was slightly better. This lode has entirely defrayed the cost of its development, and has also materially assisted in meeting other capital expenses. The new shaft at this mine was put down to a point 113 feet from the surface, at which depth the water was found too heavy to cope with. A large pumping plant has therefore been provided, and its erection is now being proceeded with. This should enable the mine to be worked to a considerable depth, and in the meantime the adit level and the No. 1 below adit, at which latter depth a cross-cut to the lode has been started, should provide large quantities of crushing stone. The year's sales and sundry receipts amounted to £12,500—an increase of £3,800 compared with the previous year; and, after deducting part cost of development, working and general expenses, but exclusive of London offices, the net profit balance for the year is £2,600.—*Straits Times.*

BORNEO NOTES

THE COAL FIELDS.

SANDAKAN, 18th June.—The general manager of the Sandakan Coal Co., Ltd., Mr. K. W. Clarke, together with the mining superintendent, Mr. C. B. Barr, arrived here, says the Sandakan correspondent of the Hongkong *Morning Post*, on the 13th inst. These gentlemen have since proceeded to Surudong, a run about 270 miles east of Sandakan, to arrange for opening up the extensive coal seams discovered in that vicinity some two years ago, which are expected in the near future to be of the greatest commercial importance to British North Borneo.

MINING.

The deposits of manganese discovered in Marudu Bay are now being worked. The fortunate discoverer, Mr. Caanaivou, has already received $1,000, and is entitled to another $4,000 when it is in thorough working order. It must, therefore, be encouraging to learn that in a few months' time, when the seven-mile railway to the coast has been completed, the shipments of ore are expected to be large and continuous.

Chromite, another important mineral recently found on the shores of the same bay, promises to be equally as valuable as manganese.

THE WEIHAIWEI GOLD MINES

Mr. T. Launcelot Dawson, A.R S.M., Manager of the Weihaiwei Gold Mining Company's mines, is making a brief stay in Shanghai, and to a representative of the *N. C. Daily News*, who sought him out, he has kindly given some interesting particulars in regard to the progress of the enterprise under his direction. Shanghai is not a gold-mining community, and even among shareholders in the company there are somewhat vague notions as to what is actually going on in the British leased territory. When the Company was first started, there was some sort of an idea that a new California had been discovered, which was to make up for any shortcomings of Weihaiwei as a political acquisition. Then came reports of the abandonment of several claims, a delay while waiting for milling machinery, and a certain amount of disappointment and despondency.

In point of fact, as Mr. Dawson pointed out, both impressions were erroneous. In the Weihaiwei leased territory there are undoubtedly reefs which will pay to work, and pay very well. The circumscribed nature of the territory is a limit to the number of workings, though gold probably exists more or less throughout the province of Shantung. But it is impossible to strike a rich enough vein at the first attempt; and in this instance four prospects were opened up and abandoned before work was commenced on the two parallel veins, Gin Tzu Ling, which are now being mined. In regard to their milling machinery the Company have been exceedingly fortunate. Situated only three miles from the coast, they have laid down a metalled road direct from the harbor to the mine for transport purposes. Instead of being compelled to wait for light railways or other means of communication, it is established already. In less than three months, it is hoped, a mill of twenty stamps, capable of crushing 80 tons of ore a day, will be in operation. Nine-tenths of the machinery has already arrived. This compares well with the West African mines, some of which were floated in 1899, and, regarded as good-paying companies, are still waiting for the completion of their mills. In cost as well as in time the saving has been enormous. The cost of conveyance of the machinery at Weihaiwei works out at about five shillings a ton, from port to mine, whereas to some of the African mines it is £10, £15, or even £20 a ton. In addition to fuel, portions of the machinery have to be renewed practically every month, so that the saving in that direction is continuous.

Another advantage enjoyed by the Weihaiwei mines is that there is no labor difficulty. About 200 miners are employed at present, nearly all Chinese coolies, though a few skilled Koreans are shortly to be introduced as foremen instructors. A miner takes a considerable amount of training, as intelligence in drilling is as essential as merely physical strength.

It is a mistake to suppose that the Company owns all the gold-mining rights at Weihaiwei. A few private claims have also been staked out; but, so far, except for the old Chinese workings at Gin Tzu Ling Mine, some of which were fairly extensive, the Company has made all the sinkings. They have staked out roughly about three miles, on the line of the Gin Tzu Ling reefs, and have had little trouble with the owners of the surface rights, who have usually been willing to sell at a reasonable figure. A good deal of the Company's property lies on ground which was formerly heath and uncultivated.

Altogether Mr. Dawson is confident that before the next annual report is presented to the shareholders, he will have been able to back it up with a few gold bars and concentrates already shipped.

THE ANHUI MINING CONCESSION

We made a short mention on Monday morning of the valuable concession in Anhui secured by Sir John Lister Kaye; we are now able to give some fuller particulars.

Sir John Lister Kaye, after four years' work in the province of Anhui, has secured for the London and China Syndicate the Imperial sanction to the Anhui mining concession; the final contract was signed in Peking on the 5th June, and the mining licence was issued on the 11th June. All therefore is complete, and it is the intention of the Syndicate to commence work without delay.

During the preliminary stages considerable development work was carried out by the prospecting mining engineers of the London and China Syndicate, and finally the Syndicate made arrangements with Messrs. J. & P. Higson of Manchester, the eminent firm of mining engineers, that they should send out to China their Mr. Ben. Rhodes, in order that he should make an expert examination and report on the concession. Mr. Rhodes arrived in China in October last, and proceeded to Anhui to carefully examine the property.

On the 2nd December last he sent a cable to Messrs. Higson of Manchester, a copy of which we have in our possession.

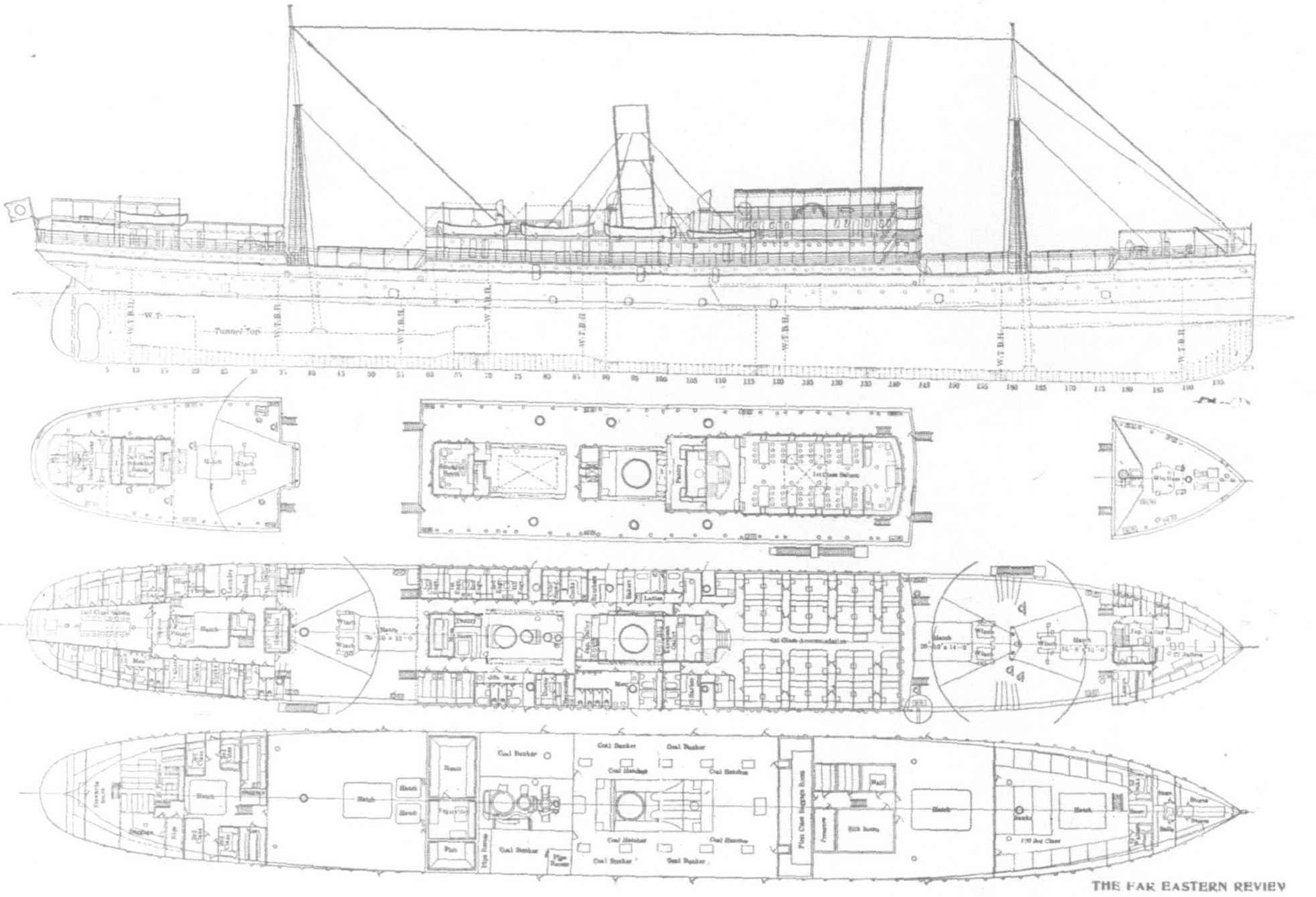
In the cable Mr. Rhodes uses the following words:—"Tungling deposit iron ore; estimated amount of ore in sight, 6,500,000; possibly not in sight, 3,500,000."

This valuable concession comprises fifty square miles, or 32,000 acres, and the main mineral deposit is situated about three miles from the Yangtze River, not many miles above Wuhu, therefore about 290 miles up the Yangtze River from Shanghai.

Selama district is forging ahead as a tin-producing centre. 324 pikuls were exported from that district last year, as against 63 pikuls in the previous year, and 11 pikuls in 1901.

In June, the Bersawah Gold Mining Company crushed 390 tons of stone for a yield of 195 ounces and six pennyweights of gold. The average stood at 10 pennyweights to the ton.

MANUAL TRAINING SCHOOL, PAMPANGA.—The Philippine Commission recently authorized the Provincial Board of Pampanga Province to make a loan of ₱1,000 to the municipality of Apalit, to be used in the construction of a manual training school.


THE FAR EASTERN REVIEW

THE AUSTRALIAN LINER NIKKO=MARU

The *Nikko-Maru*, which was launched from the Tategami shipyard of Mitsu Bishi Dockyard and Engine Works on October 23, 1903, is a steel single-screw steamer of 5,600 tons gross, built especially for the Nippon Yusen Kaisha's Australian service. The dimensions are 420 feet long between perpendiculars, 50 feet beam, 30 1-2 feet depth. The ship is very elaborately fitted for the accommodation of 60 first class passengers, 28 second class, 24 intermediate, and 108 steerage passengers. She is divided into eight water-tight compartments and is constructed with double bottom right forward, and aft. There are two complete decks, upper and main. The bridge deck, which extends for a length of 175 feet, is sheltered by the shade deck and reserved for the first class passengers' promenade, while the poop is for the second class. At the forward end of the shade deck are the captain's and other officers' cabins, Chadburn's steering, docking, and engine-room telegraphs, Lord Kelvin's compass, and other modern nautical appliances. The navigating bridge is over the chart room.

The first saloon, social hall, and smoking room in the ship are on the bridge deck. The chief decorative feature of the saloon is a square-trunk skylight which rises 21 feet from the saloon floor to the height of navigating bridge, and is 10 feet square. The upper part of the skylight is of rich stained glass. In the forward end of the saloon there are two large wireless cloisonné panels worked in wall, one panel representing wild ducks in water and the other wild ducks in flight. These are by Mr. Namikawa, a member of the Imperial household artisans and famous for his wireless cloisonné ware. The saloon itself is panelled in white oak with moderate carvings and is well lighted from the side by Messrs. J. Stone & Company's new patent large rectangular sliding windows. The revolving chairs with eccentric motion have stuffed and cane seats, so that they may be reversed to suit the climate. The sofa seats along both sides of saloon are stuffed and covered with olive-green morocco leather, and the floor is covered with rich axminster carpet. Furniture, such as tables and side-boards, are all of white oak; these with the general finish of the saloon are of inter-Anglo-Japanese nouveau design.

The saloon is large enough to seat 80 persons to table at one time and, as a whole, forms a very luxurious and comfortable saloon. Aft of the saloon is the grand stairway, panelled also in white oak and similar finish to the saloon, giving access to the first class cabins on the upper deck. It is lighted overhead by a large skylight glazed with stained glass, as well as from the sides. The center panel is a large art silk velvet, with a magnificent picture of a waterfall in black and white, prepared by Mr. Iida of Kyoto.

Situated abaft the grand stairway is the saloon pantry, well equipped with steam table, sinks, water boiler, filter, etc., all complete. The floors of saloon, entrance, and saloon pantry are covered with india-rubber mats. The social hall is at the forward end of the saloon; the wall is lined with white oak and finished similarly to the saloon. There are three silk panels with classic pictures of Mount Arashi (a mountain near Kyoto famous for its cherry blossoms), woven in silk goblin fabric. The social hall is furnished with piano, writing desks, and a number of easy and occasional chairs. It will not be amiss to add here that this social hall was fitted up at the Osaka exhibition this year and was used by their Imperial Majesties the Emperor and Empress as a retiring room during their visit. The furniture is in peacock blue with classic bamboo and flora-paulloma design in silk damask. All these fabrics are by Mr. Kawashima, a well-known silk weaver and a member of the Imperial household artisans, to the builder's design. The floor is covered with rich axminster carpet.

Further aft on the bridge deck is the first class smoking room, with walls carried up above the level of the shade deck, thus giving a greater head room. Light is admitted through large stained-glass skylights on top as well as by large rectangular windows at the sides. The walls are panelled in stained oak and adorned with an embroidery work of three "Do Not" monkeys from the painting specially executed by Mr. Takeda Seiho, a well-known Kyoto artist. The furniture includes comfortable settees, revolving chairs, and whist tables. Settees and chairs are covered with olive-green morocco leather. The floor is covered with india-rubber tiles made and supplied the by Gorham Rubber Company, U. S. A. This room has a bar fitted with all modern requisites.

The accommodations for the first class passengers, engineers, surgeon, purser, and other officers, and surgery, barber shop, galleys, etc., are in the bridge on the upper deck. There are twenty-eight first class state rooms on the upper deck and two on the bridge deck; each room is fitted up for two passengers, and is provided with iron folding beds, Broadfoot's fold-up lavatory, electric bells, and all those little accessories and conveniences which add so much to the comfort of passengers.

A poop 95 feet long forms the promenade. Upon it is built a steel house containing the steering engine, an entrance hall to the saloon below, and the smoking room, which is furnished with piano, sofa seats, chairs, and tables. The floor is covered with india-rubber mats. The furniture in the dining saloon includes a handsome sideboard, large dining table, small family table, and twenty-five revolving chairs. Both the saloon and smoking room are panelled in stained oak and of inter-Anglo-Japanese nouveau design. Seats and chairs are covered with mock-morone morocco leather, and the floor is laid with brussels carpet. Along each side of the saloon there are state rooms, provided with iron-folding beds, fold-up lavatory, etc., all finished in general respect equal to the first-class state rooms of an ordinary passenger transpacific steamer.

The after part of the main deck is given up to intermediate passengers and fore part to steerage passengers. Hoskin's patent port.

able iron beds are fitted in these quarters. The sanitary arrangements are very complete; the baths are of enamelled fire clay placed in large airy rooms with salt and fresh-water supply, douche, etc.

The vessel is provided with a sufficient number of boats to carry everybody on board when she has her full complement; and all boats are fitted with Mills' safe disengaging gear.

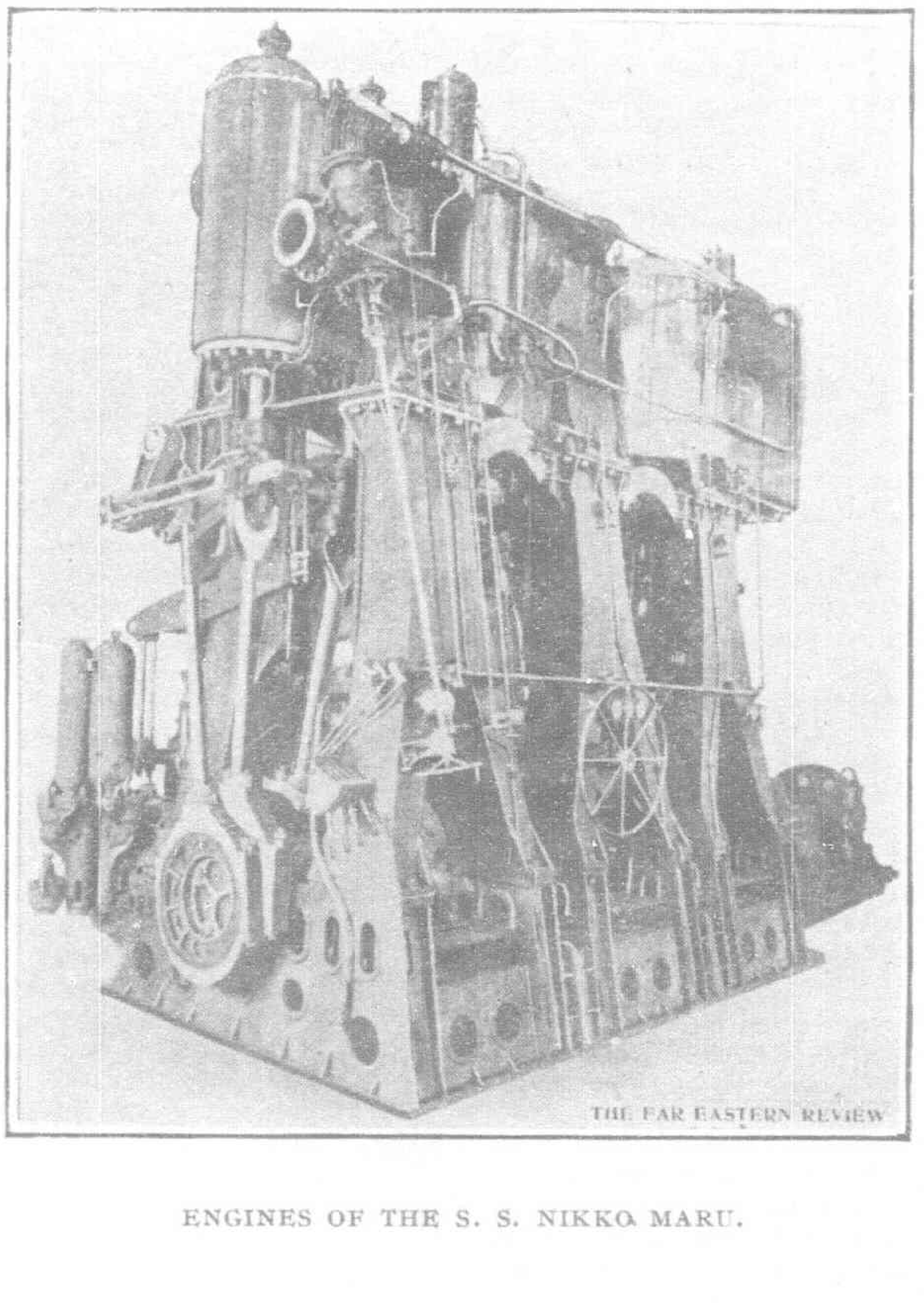
The deck machinery consists of six powerful steam winches, steam steering gear, made by Messrs. Cadwell & Company, with Hastie's patent spring brake on steering circle, hand-screw steering gear, and Napier's patent vertical steam windlasses, etc.

The *Nikko* is lighted throughout by electricity and affords a striking instance of the extent and completeness of the installations which are now fitted in first-class passenger steamers. The total number of lamps is over 500, making the total candle power slightly above 10,000, and to this must be added ten cargo lamps each of 250 candle power. The installation is on the double-wire system, and the current is supplied at a tension of 100 volts by one compound engine, driving direct-compound wound dynamo having drum-wound armature, of Clark, Chapman & Company's make, and provided with dynamo in duplicate. From an artistic point of view the installation must be pronounced extremely pleasing to the eye. In saloons, social hall, smoking rooms and state rooms, the fittings are mostly silver plate, well harmonizing with the general design and coloring. The engine and boiler rooms and quarter for the sailors, etc., are amply lighted. The installation includes the signal lamps at the mast heads, sides, and stern of the vessel, and in addition a large number of electric fans for the ventilation of the passenger accommodations and holds. A special feature of the vessel is the heating and cooling arrangement by Stewart's thermo-tank system. The plant consists of four large electric fans arranged to draw the fresh air through a ventilator and to discharge it through a nest of steam pipes with ample heating surface. The warmed air is carried all forward and aft of the different apartments by means of galvanized sheet iron trunks with openings, so that the warm air may be obtained in any room and apartment. The same apparatus is so arranged as may be used for cooling the air by leading a current of brine through the coil in thermo-tanks. The *Nikko* is the second vessel flying the Japanese flag fitted with this plant, the first being *Kumano-Maru*, in the Australian service.

The vessel is fitted with a large Hall refrigerating plant capable of making 1,500 pounds of ice per day or of cooling spacious refrigerating chamber. Cooking ranges, grills, electric ironing apparatus, hot press, vegetable steamer, etc., all of the latest type, further add to her complete equipment as a modern passenger steamer.

The engines of the vessel consist of one set of triple-expansion engines having cylinders of 31, 51, and 85 inches in diameter by 54 inches stroke. Steam exhausts into a separate cylindrical condenser with 6,414 square feet of cooling surface with a centrifugal circulating pump driven by independent engines. An Edwards' air pump, two feed, and two bilge pumps are driven by main engine. The valve gear is of the ordinary double bar link motion type, and like the whole of the working parts is provided with very large wearing surfaces. Special care has been taken to render every part as accessible as possible and the adjustments easy of execution. There are two single-ended boilers each of 15 feet 6 inches diameter by 10 feet 6 inches long, and two double-ended boilers each of 15 feet 6 inches diameter by 18 feet long, containing a total of 14,840 square feet of heating surface. The furnaces, Morrison's patent, are 3 feet 10 inches in diameter, and the grate surface is 465 square feet. See's ash ejectors are fitted in each stokehole with a powerful pump. Weir feet pumps and heater, and a Morrison evaporator are very conveniently placed. Besides these pumps and those worked by the main engines there are the usual ballast, auxiliary feed, salt, and fresh-water pumps, all conveniently arranged.

The *Nikko*, on her trial, which will take place very shortly, is expected to attain a speed of 17 knots, and on her completion, which will be sometime toward the end of the year, the builders have good reason to believe that this ship will be the finest and best of all the Japanese-Australian liners.



ENGINES OF THE S. S. NIKKO MARU.

Nippon Yusen Kaisha, or the Japan Mail Steamship Company, Limited, has a fleet which now consists of 77 steamers of a gross tonnage of 242,163 tons and 17,128 nominal horse power. Besides these there are three vessels now building like the *Nikko-Maru* above described. These vessels were until recently run under government, and now, since the war has been declared, are operated by the government for transports, etc. In the year just closed, the growth of the freight and passenger business handled by this company has increased very decidedly on all lines except the line running to Vladivostock. It operates lines from Japan to Chinese and Korean ports, to England, Australia, and America, as well as in the coast service among the islands of Japan.

OSAKA HARBOR WORKS

The following description of the Osaka Harbor Works is taken from the "Up-to-Date Guide Book to Japan," published last year. It is reprinted as a matter of general interest, giving as it does the full details of the great work now in course of construction. The work has progressed greatly since the following was published.—*Editor*.

Though the city of Osaka has been recognized as the most important commercial center of the Empire since two hundred and fifty years ago, it was almost limited within the Empire until the Restoration. Since the Meiji era Osaka loomed in the stage of international communication and made special strides and progress. The late Japan-China War brought particular expansion upon the industry and commerce of the Empire. The amount of both exports and imports showed remarkable increase year by year, and steamship communication extended its routes to the Western Continents. The city of Osaka is not the commercial center of Japan, but that of the Orient.

It was a long cherished desire by the people of Osaka to build a new harbor, so as to make it the shipping center at the same time, because the present harbor is too shallow to admit ocean-going steamers. Time has ripened and the authorities of the government have recognized the necessity of constructing a complete harbor there. The scheme was made to accomplish this big work within eight years (1897-1904), with a capital of yen 22,500,000, under the supervision of Mr. S. Nishimura, ex-Governor of Osaka, whose reputation and trustworthiness by the citizens and many other experts, is recognized. The new streets will be formed at the same time by reclaiming a portion of land, and the limits of the city will be expanded to the western extreme along the shore. All the railway lines which enter into the city will extend their way to the piers, and their cargoes will be taken thence to every part of the Empire. On completion of the work, Osaka will come to the front as the foremost commercial city of the world.

THE PLAN OF THE WORK.

The scheme is to divide the harbor into two parts—the Inner and Outer Harbor. The Outer Harbor is surrounded by the North and South Breakwaters. The starting point of the North Breakwater is 3,900 feet from the south-west of the lighthouse at Temposan old fort, proceeding straight into the sea in the same direction, ending at 28 feet depth below low water, and forming a quadrangular curve at the extreme; the length is 8952 feet. The South Breakwater commences from 5,580 feet off the lighthouse at the Shirinashi river, extending 2,520 feet to the northwest direction, following in 11,130 feet towards the west, and ends at the same depth, curving at the end so as to face the North Breakwater. The entrance width between pierheads is 600 feet at the bottom. The Inner Harbor begins at the south bank of the mouth of the river Kidzu, running 1,980 feet northwest, then turns to the northwest for 3,480 feet, and is surrounded by the Inner Harbor Dyke, which joins the South Breakwater. Nearly 1,240 acres out of the total space of the water area enclosed are to be reclaimed for the site of the new city and the docks.

The distance from the reclaimed ground of the Outer Harbor to the entrance of the Harbor is 10,320 feet. *The main dimensions* are as follows:—

	Breadth.	*Area.*
Outer Harbor........	3,000 ft.—4,950 ft.	894 acres.
Inner Harbor.........	1,550 " —1,800 "	339 "
Mouth of the river Aji.....	720 " —1,200 "	40 "
" " " " Shirinashi	420 " — 480 "	35 "

The dock water areas are:—

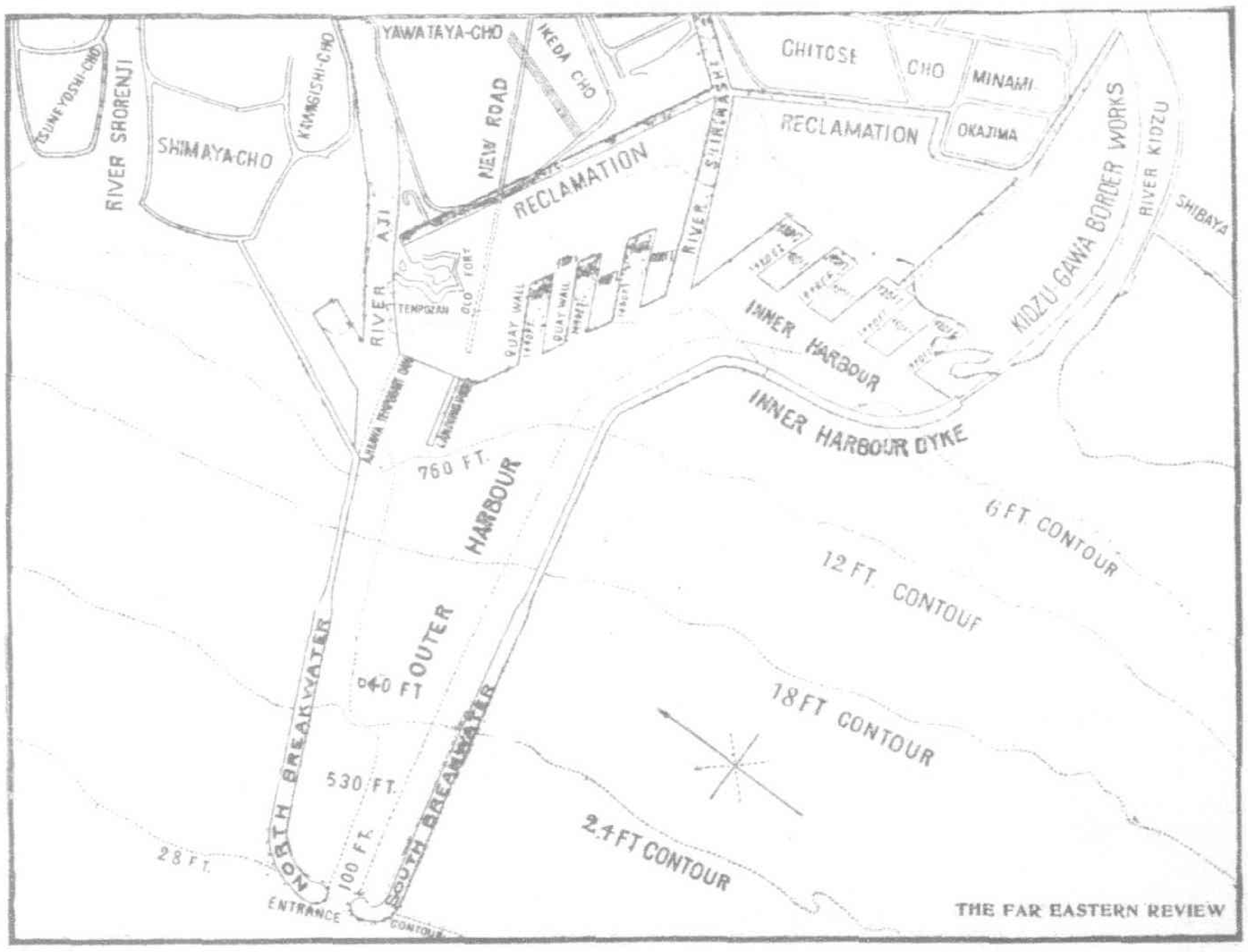
	Length.	*Breadth.*	*No. of Docks.*	*Area.*
Between the rivers Aji and Shirinashi ...	1,440 ft.	480 ft.	3	48 acres.
Between the rivers Shirinashi and Kidzu.........	1,440 "	480 "	3	48 "
	1,440 "	720 "	1	24 "
Northern part of the river Aji............	2,150 "	480 "	1	24 "
Total area...........................				144 acres.

The channel for steamers to get in from the entrance is about 600 feet towards the South Breakwater, off the center, while the north side is used for anchorage. The loading and discharging of cargoes are to be made at the quay walls and at the landing pier, 1,500 feet in length and 540 feet breadth. The ground between each dock is 480 feet in breadth, to be used for dock plants, warehouses, roads, etc. The dredging of the Harbor and the building of docks is proceeding apace. Two docks will be built first, commencing from the north side between the rivers Shirinashi and Aji, along which 24 vessels of 2,500 tons average can berth at one time. On completion of all the docks the capacity will be 3,000,000 tons of cargo a year. Many canals will be opened on reclaimed ground, one connecting rivers Aji and Shirinashi (150 ft. broad) commencing at the north side of the Temposan old fort along the west end of Yawataya-shinden, and the river Shirinashi will run into the Inner Harbor across the reclaimed ground, 360-480 feet in width; the third dock, situated on the southern portion of the Shirinashi river, being made bigger than the others, with the width of 720 feet so as to open a new water passage through the southern end of Minami Okajima, and to meet the river Kidzu, 150 feet in width, while another canal to join the rivers Shirinashi and Kidzu will be opened along the western extreme of Chitose and Minami Okajima. A temporary dam of over 3,600 feet will be built from the beginning of the North Breakwater to the Temposan old fort, so as to prevent the silt coming from the river Aji, which is to be taken off after completion of Yodo-gawa diversion work, thus joining the Aji with the Harbor.

The work was commenced by the city in October, 1897. The course of the work, as executed during the past three years up to October, 1900, is as follows:—

SHORE PROTECTION EMBANKMENT OF RIVER KIDZU.

The shore protection works along the mouth of the River Kidzu, starting at the southern extremity of Chishima-Shinden, are to reach to the inner Breakwater, and have a length of 9,706 feet, and a height of from 12 to 15 feet above low water, and a width of 18 feet at the top, and a slope of 1 in 2 on both sides. The inside of this embankment is filled with ordinary earth throughout the whole length. The surfaces on both the top and sloping sides of the Embankment are covered with clay puddle for a length of 1,479 feet beyond starting-point at Chishima-Shinden, and the remaining 8,227 feet are faced with rubble stones to a height of from 8 to 15 feet above low water on the outer slope, while the top and rear sides are covered with clay puddle. The work was commenced on July 3rd, 1898, and completed December 10th, 1899.



PLAN OF THE OSAKA HARBOR IMPROVEMENTS.

INNER BREAKWATER.

This Breakwater, starting from the end of the River Kidzu Embankment, will reach to the South Jetty, and is to be carried for a length of 4,920 feet, bending towards the Harbor. The work was commenced in December, 1897, from the shore end, and half is already finished, whilst work on the remaining half is going on at present. The preliminary step is to strew the site of this Breakwater with rubble stones, the spaces between being filled with gravel and ballast; then the front side is built up with large hewn stone blocks, each weighing over half a ton, and this work is to reach 15 feet above high-water level, and have a width of 18 feet at the top and a slope of 1 in 1 on front face, and 1.3 in 1 on back face; on the top of this concrete blocks will be piled up in two courses. The materials used, up to the present, for this work are 20,880 cubic yards of large hewn stone blocks, 992 cubic yards of ordinary rubble, 42,832 cubic yards of gravel and ballast, 1,048 pieces of concrete blocks, and 3,000 cubic yards of large rubble.

CONCRETE BLOCK YARD.

The Block-making Yard is a portion of reclaimed land, the reclamation of which was commenced on the 15th June, 1898, and finished on the 16th January of the following year. The area of the yard is 20.8 acres. As soon as the reclamation was completed, the stores, godowns and buildings were constructed, and the setting up of the machines and other useful accommodations for this branch of the works were carried out and completed on the 29th of December, 1899. The block-making has been going on continuously since its commencement on the 20th January, 1900. The total required number of blocks being 60,000, it is expected to finish them within five years, the average daily production being forty pieces. The materials of the blocks consist of Portland cement, sand, and gravel, well mixed by the proper method. The blocks will be all one size, each 6 feet by 5 feet by 4 feet, or 120 cubic feet, weighing 8 tons (17,920 pounds). Blocks to the number of 6,900 have been made since the work began, 3,900 of these being used already for jetties and breakwaters.

INUJIMA QUARRIES.

The Quarries were opened in April, 1898, at Inujima, an island about seventy miles distant westward of Osaka, from whence the stones for the works will be entirely procured and transported to the place by Japanese barges and steamboats, specially built for the purpose. There are two Quarries, both being expected to supply the same quantity of material; therefore each has precisely the same accommodation. The principal works laid out are four Loading Piers, Stone Storage Yards, Earthworks to remove the sand and earth from the Quarries, Railway Tracks extending three miles, twenty rock drilling machines, as well as Electric Lighting Plant. The stones taken from the Quarries up to the end of September, 1900, since the Works commenced, amount to 295,000 cubic yards. Of these 131,190 pieces were large rubble, weighing a ton or so each, and totalling 96,800 cubic yards in volume.

WORKSHOPS.

The Workshops are intended for the purpose of repairs to ships' machinery, instruments and tools, etc., used on the Works. The yard is a portion of the reclaimed land, having an area of 6.5 acres, and equipped with necessary buildings, machinery, docks, and slips, etc., and have been in operation from April, 1899.

The Shops are divided into two departments, viz., *Machinery Department and Ship Department.*

The Machinery Department is sub-divided into Finishing, Smiths', Casting, Riveting, and Joiners' Shops, and the Ship Department is sub-divided into Ship-building, Ship-riveting, Caulking, Painting, Sail-making, Leather Working, Sawing, Laborers' and Brick-laying Shops, etc. Besides these are four Slip Ways, belonging to the Ship Department, which are intended to serve for repairing of stone-carrying steamboats and earth barges. There are two Graving Docks, one of which has a length of 148 feet, with a width of 62 feet, the other being 234 feet by 79 feet; the drying up of these Docks is accomplished by a vertical engine driving two pumps situated between the two Docks. For discharging the water out of the Docks three hours is required for the former and four and one half hours for the latter, the suction pipes used being one of one foot internal diameter for the smaller Dock and two of the same diameter for the larger.

SOUTH JETTY.

This Jetty, starting from the extremity of the Inner Breakwater, is to be built out to a length of 14,631 feet, having a height of 11 feet above low water, a width at the top of 18 feet, and a slope of 1 in 1 on either side. The Jetty is to be covered with concrete blocks on its top and sides, to reach a depth of 14 feet below low water on the sea side and 6 feet on the harbor side respectively. Since this work began in January, 1899, up to the end of September, 1900, a length of 4,020 feet has been nearly completed, the work of throwing down the rubble having been accomplished, and the seaside slope for that length being covered with three to five concrete blocks already; the remaining 10,611 feet of this Jetty are now in progress, the throwing down of rubble being carried on. The work of depositing the rubble is being done with *Inujima-maru* No. 6, and *Hayashiwo-maru* No. 15, specially built for the purpose, of which the former is bottom-tipping, with a carrying capacity of 600 cubic yards, and the latter is both side and bottom-tipping, with a capacity of 200 cubic yards. The material used up to the present totals 274,264 cubic yards of large rubble, and 2,837 pieces of concrete blocks.

Dredging.

The dredging was commenced on 18th April, 1898, with six Priestman's Dredgers, at the mouth of the River Shirinashi. Afterwards two Bucket Ladder Dredgers, two Sandpump Dredgers, which were imported from Holland in July, 1899, two excavating machines, erected in November, 1899, and two other Self-propelling Bucket Ladder Dredgers, were added for the Works, besides manual power adopted at several places. The material dredged and excavated, after being transferred into barges or punts alongside, is conveyed to its destination, where it is either discharged into deep water outside of the jetties or deposited on the bank by manual labor. The dredging capacity of the dredgers differs somewhat according to the nature of the bed, but in general Sandpump Dredgers and Self-propelling Bucket Ladder Dredgers have a capacity of 480 cubic yards per hour, whilst two Bucket Dredgers have a capacity of 160 cubic yards per hour, and the Priestman's Dredgers 40 cubic yards per hour. The aggregate volume of the material dredged up to the end of September, 1900, since the work commenced, amounts to 1,886,544 cubic yards.

Reclamation of Temposan Frontage.

The land reclaimed in this section has an area of 186 acres; its surrounding dike extends to the length of 8,308 feet, its height being proposed to be 9 feet above low water, with a slope of 1 in 1 in the outer and 1½ in 1 in the inner side, and a width of 6 feet on the top. The foundation work of throwing down rubble and gravel was commenced on the 1st January, 1899, and a large portion of the whole work has been finished. The materials used up to the end of September, 1900, was 44,856 cubic yards. The reclaiming of this lot is now carried on by the dredgers.

Lock-up of the River Aji.

This work on the river Aji is the temporary masonry dam, starting at the north extremity of the Temposan reclamation, and reaching to the starting-point of North Jetty, having a length of 2,244 feet, a width of 6 feet at the top and a slope of 1 in 1 on either side, and a height of 9 feet above low water.

This work is to prevent the silt carried by the flood water entering the harbor during the construction, and when the diversion of the river Aji, which is now being carried out by the Government, is completed and the present river is canalized, this lock-up will be removed.

Total Cost.

Estimated total cost for the work amounts to Yen 18,678,000, particulars of which are as follows:—

South Jetty...	Yen 3,871,248
North Jetty	2,312,639
Docks and Quays	209,580
Shore Protections and Dikes ...	404,679
River Aji Temporary Locking and expenses for removing same, etc.	32,630
Dredging and Reclaiming... ...	2,037,000
Steel Piers...	2,585,000
Light Houses	60,000
Bridges	100,100
Stores for Materials	100,000
Land Purchased and Compensation	24,300
Workshop and Machinery	3,435,000
Surveying Expenses...	700,000
Office Expenses	969,760
Contingencies	1,836,064

Besides above, Yen 4,442,400 is required for the interest of Public Loan Bonds, specially issued for this work, during the course of construction, which, added to the working expenses, makes the aggregate sum of Yen 22,490,400.

WHANGPOO RIVER IMPROVEMENT

(Continued from page 3.)

in consequence of a shallower section of the river, or of an expansion in width, or of the entrance of a tributary under unsuitable conditions. It must be remembered that we are not dealing with a natural river, which might be credited with having chosen for itself its most suitable direction, but with an artificial river. The Huangpu from the Garden Bridge to the Yangtze was originally the continuation of the Soochow Creek, and the reach in front of the Bund is an artificial cutting which was led into the then Soochow River at right angles, and it is to this we owe the present condition of this part of the river.

The increase in the velocity of the current at Pootung Point has not been limited to the extent unavoidable in consequence of the sharp bend encountered there, but has been unnaturally increased by the contraction of its course. As the sketch shows, it is proposed to correct this by removing the spit at Pootung Point. Again, the unavoidable increase in the velocity of the current at Pootung Point has not been reduced lower down to the normal by the existence of a river bed of equal section. On the contrary, the ebb tide, on issuing from the Pootung Narrows, enters a basin which is much too wide for its reception, and where it is not properly trained, and the chowchow water already referred to is the result. By this chowchow water the river bed is scoured out into a deep hole, and the resulting silt is deposited in the dead backwater below the Pootung Point. The so called City Bar is also a consequence of the excessive width of the river's bed. It is, therefore, necessary that the river immediately below Pootung Point should be reduced to its normal width, by which reduction the channel navigable by large vessels would be increased.

Again, the Soochow Creek now enters what was once its own continuation, but has become a separate river, under the most unfavorable imaginable conditions—that is to say, against, instead of in line with, the current of the river. In other words, the present mouth of the creek does not point down river as it should, but up river, so that the flood tide has no free entrance and the ebb tide no free exit. The mouth of the creek must be corrected, as the sketch below indicates, so that it may point down-river, and must be reduced to the section called for by its present reduced size. When this is done the influences equally disturbing and prejudicial to the river and the creek will be removed. An incidental advantage will be a considerable and valuable addition to the area of the Public Garden, which is confessedly much too small for the existing foreign population of Shanghai. The correction and proper bunding-out of the right bank of the river will put a stop to the continuing tendency of the Huangpu still further to eat away its concave banks. Every foot of mud that the river eats away in one place it deposits in another place where it is not wanted.

The objection is made that by the scheme proposed the river will be greatly narrowed. Undoubtedly the actual surface of the river will be narrowed; but the concomitant increase in depth and in uniformity of depth will much increase the navigable width of the river. The attainment of a uniform width of fifteen hundred feet of fairly deep water will enable much larger vessels than now to come into the harbor, to come up to the wharves, and to swing freely at their moorings in the centre of the channel, with a navigable passage on each side for incoming and outgoing vessels respectively. Much of the present width of the river, useful as it looks on the surface, is really useless except to small craft from its concomitant shallowness; and the advantage of so deepening the channel that the big mail and cargo steamers, which cannot now come beyond Woosung, will be able to come right up to Shanghai, will appeal to everybody; and the present scheme promises to secure this without the levying of any tax on the community or the shipping—a very important point; and we commend it accordingly to the careful consideration of all who are interested in the present and future welfare of Shanghai.

SAIGON IMPROVEMENTS

All those who have visited Saigon (says the *Siam Free Press*) are unanimous in saying that that capital is one of the neatest and most cleanly kept cities in the Extreme East. There are few towns on this side of Suez that can boast of finer, gayer, or more splendid streets and roads and public buildings, and the aspect, on the whole, is very pretty. The waterways, too, have been greatly improved of recent years, while systems of canals and railways are being rapidly extended.

That the trade and commerce of Saigon have prospered, and continue to flourish rapidly of recent years, there can be little doubt. The best evidence of this is that the authorities are taking measures to have the harbor extended and improved, new wharves erected, and every facility afforded to shipping business.

The recent Havas' telegram announcing that on the proposal of M. Ferrière the colonial congress has unanimously approved of a loan for sanitary works at Saigon, is another proof of the growing importance of that place, and that the Government are determined to leave nothing undone to make the capital and its environs a model city as far as hygienic and sanitary arrangements are concerned. It is only fair to say that in few places in the Far East has such care been bestowed on these respects as at Saigon, and still the sanitary requirements of the place are receiving the careful attention of the authorities, who are still making great efforts to maintain the good conditions secured.

One excellent feature in the municipality's management has been the granting of sanitary certificates to houses which comply with certain recommendations over and above what are considered to be essential for health. Visitors, therefore, as well as the community in general, will know how to appreciate this wise precaution, which is largely undertaken in their interest.

When the new sanitary project will be realized, Saigon will be still more improved and as well laid out as any city in the Extreme Orient. Though its climate is not so highly favored as that of other localities, facts are not wanting to show that the place is becoming more and more attractive, and is rapidly growing in importance as a trading port.

PUBLIC IMPROVEMENTS, SIAM

Siam has been exceedingly fortunate in her financial advisers, and the result of their efforts is apparent in the satisfactory state of the country's revenue and expenditure. From the telegram which we publish to-day regarding the Siamese Budget estimates, it will be seen that the revenue is expected to yield 47,500,000 ticals, or practically two millions in excess of the estimate for last year. The expenditure, however, seems to keep pace with the increasing revenue, the estimate for 1904 being 47,251,306 ticals, leaving an estimated balance on the right side of the account. No mention is made of the purposes to which this large expenditure is to be applied, beyond the statement that some six million ticals are to go in railway construction; but there are many and urgent public works which will have to be taken up in the immediate future, involving immense sums of money. For instance, Bangkok, although having a population of something like 600,000, is without a water supply, the result being that cholera periodically sweeps through the people, decimating natives and *farangs* alike. The railway system in the country is only in its infancy yet, rivers and canals being almost the only means whereby locomotion is possible. No doubt the Siamese officials have big ideas on the subject of opening up the country, but it will be many days to come before Burmah is in direct railway communication with Bangkok. Indeed the probability is that Hue or Meluprey will be connected with the Siamese capital before the importance of railways to British interests in the north is fully recognized. One satisfactory feature about Siam's financial position is the stability of the tical, which has shown no signs of fluctuating during the past few months.—*S. Times.*

THE WALLS OF MANILA

BY MAJOR JAMES C. BUSH, U. S. A.

(Courtesy of Squires, Bingham & Co.)

In May, 1570, Captain Juan Salcedo, the grandson of Legazpi the conqueror, was despatched from Cebu to the Island of Luzon, to reconnoitre the territory and bring it under Spanish dominion.

It appears that a few soldiers under Martin de Goiti, who afterward overran the Pampanga country, accompanied Salcedo to the north. Goiti was killed as Maestre de Campo during the attack of the Chinese in 1574.

They were well received by the native chiefs Lacandola, Rajah of Tondo, and his nephew, the young Rajah Soliman of Manila.

The sight of a body of European troops, armed as was the custom in the 16th century, must have profoundly impressed these chieftains; otherwise it seems hardly credible that they should have consented, without attempt at resistance or protest, to give over their land, yield their independence, and become the subjects of an invading foreigner.

A treaty of peace was signed, and ratified by an exchange of drops of blood; promises of rewards made to the Lacandola family, under oath; together with a remission of tribute in perpetuity.

Legazpi, being advised of what had occurred in Luzon, proceeded to Manila, took formal possession of the surrounding territory, declared Manila to be the capital of the Archipelago, and proclaimed the sovereignty of the King of Spain over the whole group of islands.

Gaspar de San Agustin, writing of the period, says: "Legazpi ordered the natives to finish the building of the fort in construction at the mouth of the Pasig, so that His Majesty's artillery might be mounted therein for the defense of the port and town. Also he ordered them to build a large house inside the battlement walls for Legazpi's own residence, and another large house and church for the priests, etc. Besides these two large houses he told them to erect 150 dwellings of moderate size for the remainder of the Spaniards to live in. All this they promptly promised to do, but they did not obey, for the Spaniards were themselves obliged to complete the work of the fortification."

The City Council of Manila was constituted on the 24th day of June, 1571. 1570 would, therefore, appear to be the date of the inception of Fort Santiago and the walls of Manila. These primitive works were built of timber. The first stone walls raised on the enceinte owed their origin, it is believed, to the efforts of the Governor, Santiago de Vera. Perez Dasmariñas, who arrived in 1590, continued and improved these walls and also completed the erection of the stone Fort Santiago.

These erections were probably hastened by the events of 1574 the period when the possession of the Islands was unsuccessfully disputed by a rival expedition under command of a Chinese Li-ma-hong. His fleet consisted of 62 war junks, having on board 2000 sailors, 2000 soldiers, a number of artisans, and all that could be carried with which to gain and organize a kingdom.

On the 29th of November, 1574, the squadron arrived in the Bay of Manila, and Li-ma-hong sent forward his Lieutenant—Sioco, a Japanese—at the head of 600 men to demand the surrender of the Spaniards, who, refusing to give credence to reports and alarms, found the Chinese within their gates before resistance could be offered.

By daybreak, December 3rd, Li-ma-hong disembarked 1500 men, who advanced in three divisions under the leadership of Sioco. The city was set on fire, and the enemy moved upon the fort while the fleet supported the attack.

Sioco at length entered Santiago, and a hand-to-hand fight ensued. For some time the issue seemed doubtful, but Salcedo finally gained the victory and pursued the Chinese, who, harassed on all sides, fled in disorder to their ships.

By royal decree, King Philip later directed that the city of Manila be fortified in a manner to insure it against all further attacks and uprisings.

Gomez Perez Dasmariñas, the next Governor, brought with him from Spain the Royal instructions to carry into effect the above decree. Hence the work begun in 1590, and continued under many Governors till 1872. As this construction was carried on during different periods, often far apart, the building was not executed, therefore, according to any uniform plan. The evidence of this is clearly apparent, not only in the character of material employed, but in the varied and various systems of fortification represented, thus rendering the enceinte a most interesting study. Earth, brick, and volcanic tufa appear to be the materials used: brick for facing embrasures and parapets, earth and tufa for walls.

By this same decree the number of European troops in the colony was fixed at 400 men-at-arms, divided into six companies, each under a captain, a sub-lieutenant, a sergeant, and two corporals.

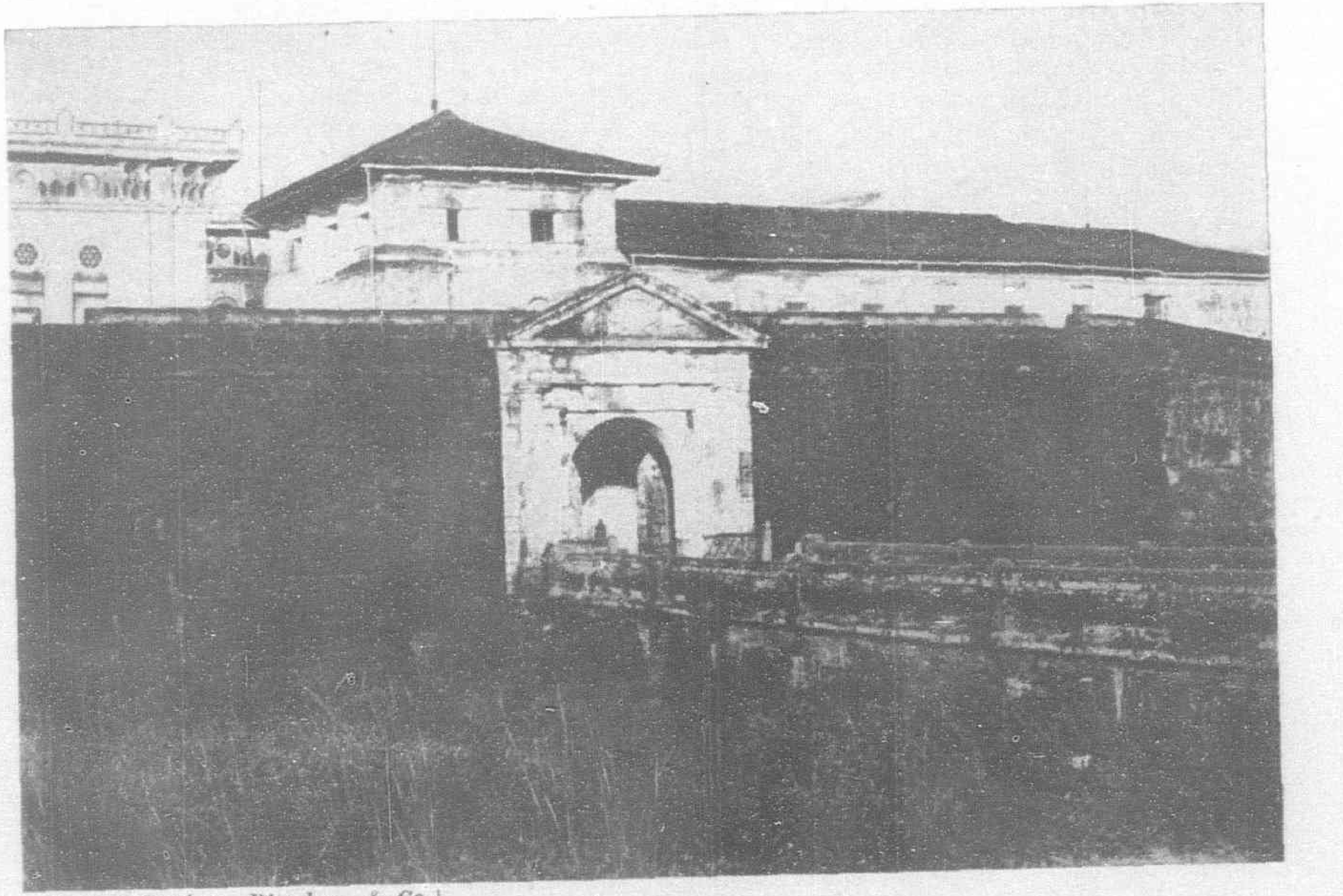
Recruits from Mexico were not to enlist under the age of 15 years.

The Captain-General was allowed a bodyguard of 24 halberdiers, under the immediate command of a captain, the whole forming a strange force for so large an undertaking.

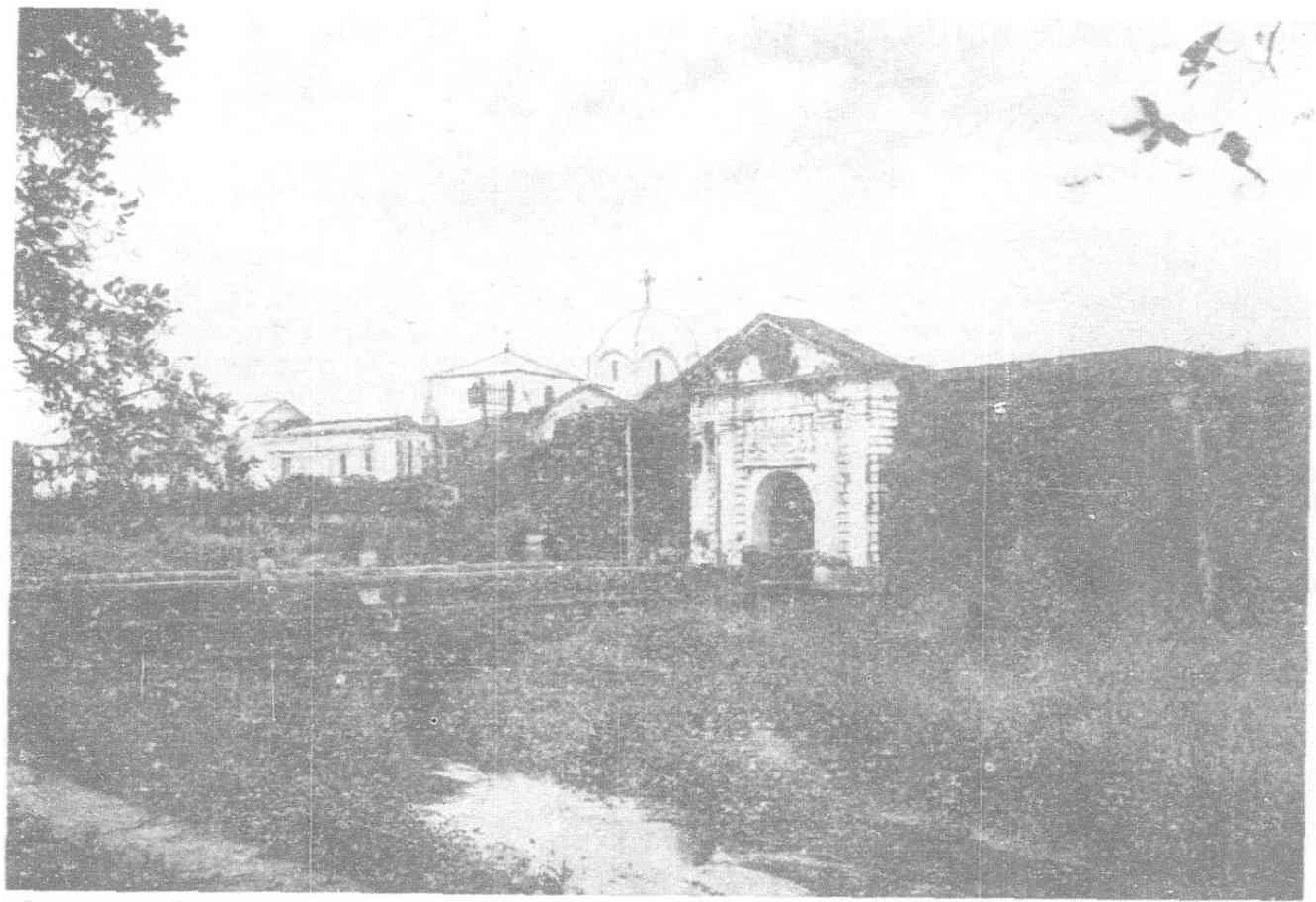
History records that in the year 1603, two Chinese mandarins came to Manila, as ambassadors from the Emperor to the Governor-General of the Philippines. These officials shortly returned to their own country. But the greatest anxiety prevailed in Manila, where rumors circulated that another Chinese invasion was in preparation. The natives openly avowed to the Chinese, who had entered the country in large numbers, that whenever they saw the first signs of a hostile fleet arriving, they would murder them all. The Chinese were accused of secreting arms; the cry was falsely raised that the Spaniards had fixed a day for their extermination; they daily saw weapons being cleaned and put in order. There was, in short, every circumstantial evidence that the fight for their existence would ere long be forced upon them. In this extremity they were constrained to act on the offensive, and finally on the eve of St. Francis' day, the Chinese openly declared hostilities and threatened the city. They totally defeated the Spanish force sent against them, killed ex-Governor Dasmariñas, and, encouraged by this first victory, besieged the city. After a prolonged struggle, they were defeated and obliged to yield. It is estimated that 24,000 Chinese were slain or taken prisoners in this revolt.

Further wall building followed.

Juan de Silva executed certain work on the fortifications in 1609; which was improved by Juan Niño de Tabora in 1626; and again improved by Diego Fajardo in 1644, the erection of the San Diego bastion being completed in that year. This bastion, formerly called Fun-



(Courtesy of Squires, Bingham & Co.) SANTA LUCIA GATE.



(*Courtesy of Squires, Bingham & Co.*)

PARIAN GATE.

dición or Foundry, and situated at the extreme southern angle of the enceinte—facing bay and land—appears to have been the first of the large bastions added to the encircling walls, then of no great height or finished construction.

Buzeta, writing in 1851, declares Diego to have been the only fort existing on this part of the line for some time after its construction. In trace it appears to exemplify the method of Errard de Bar-le-Duc, the engineer of Henry of Navarre (about 1606). The shape of the bastion very much resembles that of an ace of spades; its orillons or curved corners (ears) masking small pieces of ordnance placed on the drawn-in flanks; and sometimes on the ears themselves, to defend the ditch.

One marked characteristic of this earlier work, as regards trace, results from placing the flanks of the bastions perpendicular to the curtain—the portion of wall joining two bastions.

Previous to 1645, when Count de Pagan of France published his treatise, which contained the development of a system that in a short time entirely superseded those of his predecessors, all bastion flanks were placed perpendicular to the faces of the bastions themselves or to the curtain wall. This last condition is exemplified in all the work on the Manila enceinte built before 1739.

Pagan made the flank perpendicular to the line of defense—the line joining the curtain angle of one bastion with the salient of the next—in order as much as possible to cover the face of the opposite bastion.

Vauban, 1633-1707, "followed up the principles suggested by Pagan and employed them extensively, with consummate skill and judgment." An example of his first method appears upon the walls later on.

José Torralba erected another flanking element close to the Almacenes gate on the Pasig river side (1715). This flank defense fell about 1796, to make way for the new front of that date; and the Almacenes gate and the curtain wall on Calle de la Maestranza have very recently (1903) been demolished to afford more room near the Muelle de Almacenes (Storehouse wharf).

In 1729, Governor-General Fernando Valdés y Tamon restored the walls, which were afterwards heightened by Juan Arrechedera in 1745. The inscription over the portal inside Fort Santiago and the map of 1739 clearly prove that Valdés y Tamon had made certain additions to this fort, and the walls in general, during the restoration in question. And it seems equally certain that Fort Santiago and the curtain walls on the west, or bay side, and the east, or land side, remain to-day very much as Tamon and Arrechedera left them.

Certain ravelins and one bastion have been added to these two fronts, but the scarp remains otherwise practically unchanged.

The work of Valdés y Tamon and Arrechedera completed the wall construction under the old school methods—the methods of the Italian masters; of Errard; and the "Compound System" of de Ville (1629), which united the methods of the Italian and Spanish schools. An examination of the wall at the end of this period cannot be without interest, and the map of Valdés y Tamon (photo map) affords a clear idea of its condition.

La Real Fuerza de Santiago (The Royal Stronghold of Santiago), as Dasmariñas left it, consisted of a castellated structure, without towers, trapezoidal in trace, its straight, gray front projecting into the river mouth. Arches supported an open gun platform above, called battery Santa Barbara—the patron saint of all good artillerists. These arches formed casemates which afforded a lower tier of fire through embrasures. Curtain walls of simplest character, without counterforts or interior buttresses, extended the flanks to a fourth front facing the city.

Valdés y Tamon seems to have added, at a lower level, a large semi-circular gun platform to the front, and another of lesser dimensions to the river flank. The casemates were then filled in, and the embrasures closed. He also changed the curtain facing cityward to a bastion front on a system prior to that of Vauban. A lower parapet bordering the interior moat connects the bastion salients.

Appended is a photograph of the quaint 16th century gateway, recently restored, opening upon the exterior Plaza de la Fuerza.

Leaving this plaza, whose ramparts have been changed since 1739 to form a sort of extension of Fort Santiago, we come upon a line of wall facing the bay, without interior buttresses, and of the same simple construction as the curtain in the fort.

The tracing shows a cross section of the rampart, moat, and covered-way recently taken at the west end of Calle Aduana. Neither this moat nor the covered-way existed in 1739, but the curtain wall remains essentially the same. The masonry simply forms a retaining wall for a terrace of earth in the rear—a rampart without other parapet than a breast-height wall, one and one-half feet in thickness. The same general construction obtains, with certain exceptions, throughout its length from Calle Aduana to San Diego bastion.

Four small bastions of ancient work, evidently added to the original wall, still exist on this front. Of these, two have the northern flank, and one, near Santiago, the southern flank half again as long as the other, thus producing a curtain line en cremaillere.

That these bastions were not a part of this particular wall as at first built can hardly be doubted. They differ in construction, and it is certain that the old north front possessed no bastion prior to the one erected by Torralba in 1715.

The same condition unquestionably obtained originally on this western or bay side where the indentation (en cremaillere) afforded the only flank defense until Silva and Tabora executed their projects 1609-1626, by adding bastions at these points.

Differing entirely from the others, the primitive character of this front points to considerable age, which idea is confirmed by the size and shape of its bastions. Small and narrow in plan, with flanks considerably longer than the faces, and standing perpendicular to the curtains, they answer in description to that of the old bastions of the Italian masters, of which those by Micheli on the enceinte of Verona, 1523, are supposed to be the oldest extant. Micheli's bastions are small, with narrow gorges and short faces, and are placed at great distances apart; it being the invariable practice when they were built, and for a considerable time afterward, to attack the curtains, and not the faces of the bastions.

On the land front bastion building slowly progressed, and before 1739 two others appeared, San Andrés and San Lorenzo, similar in plan to San Diego, evidently a part of Fajardo's project (1644).

A fourth bastion with perpendicular, straight flanks joined itself to the north-east angle. This also exists, but greatly changed by subsequent engineers.

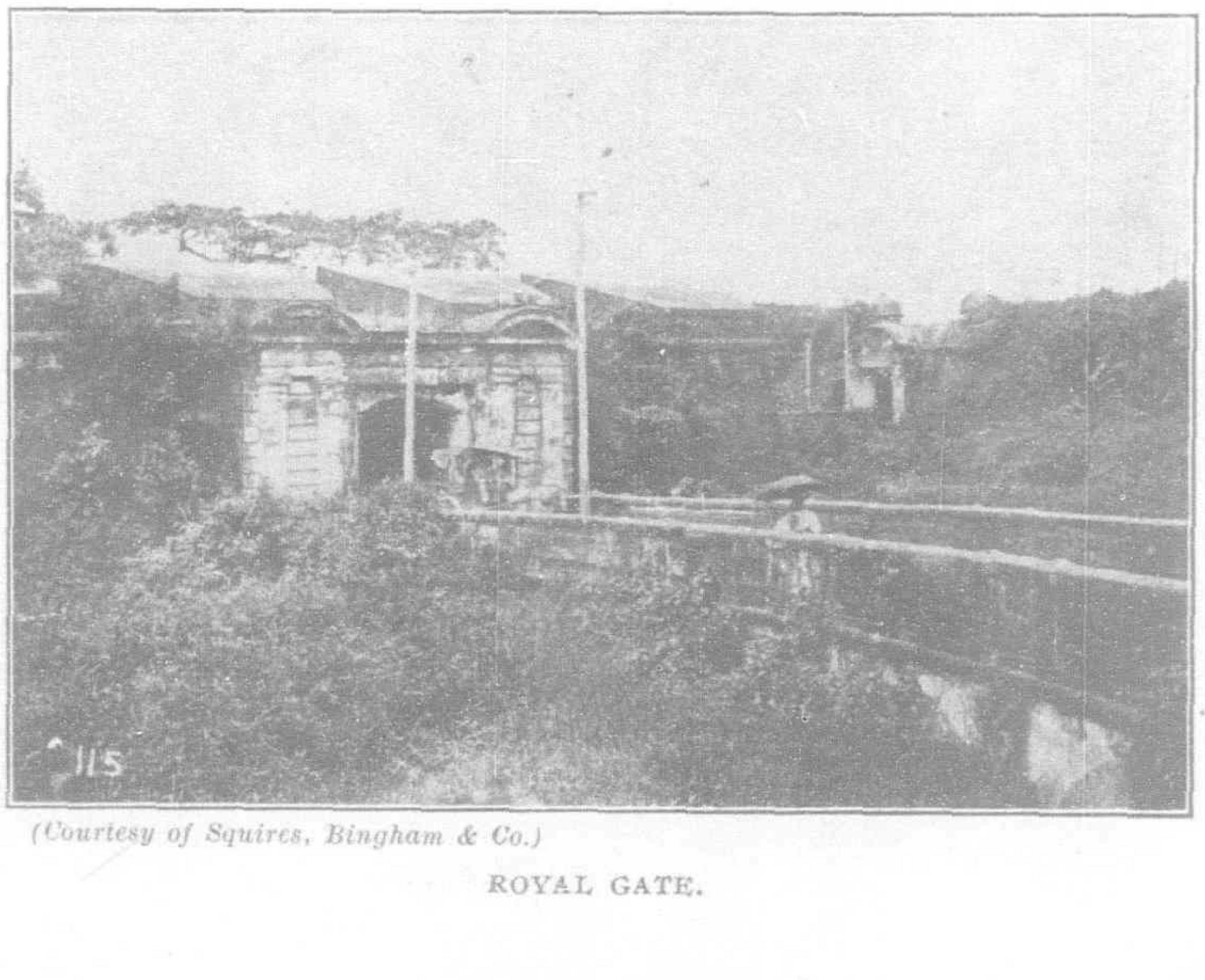
Neither the west nor the land rampart affords other than a single tier of fire from open batteries.

Of the original north front little remains, this work having been entirely remodeled at the end of the 18th century. It consisted of a simple wall on an indented trace, without bastion till 1715.

Tartaglia, an Italian master, first described the covered-way in 1554, so that it must have been used at a much earlier epoch of Italian fortification.

It is somewhat surprising, therefore, that so little work of this character appears on the map of Valdés y Tamon.

An estuary limited the city on the east and south-east, and this appears to have been excavated, in part, forming a rude moat; beyond which a low wall, constituting a line of redans, with a place of arms opposite the old Real



(*Courtesy of Squires, Bingham & Co.*)

ROYAL GATE.

(Courtesy of Squires, Bingham & Co.)

OLD SPANISH BATTERY ON THE WALLS.

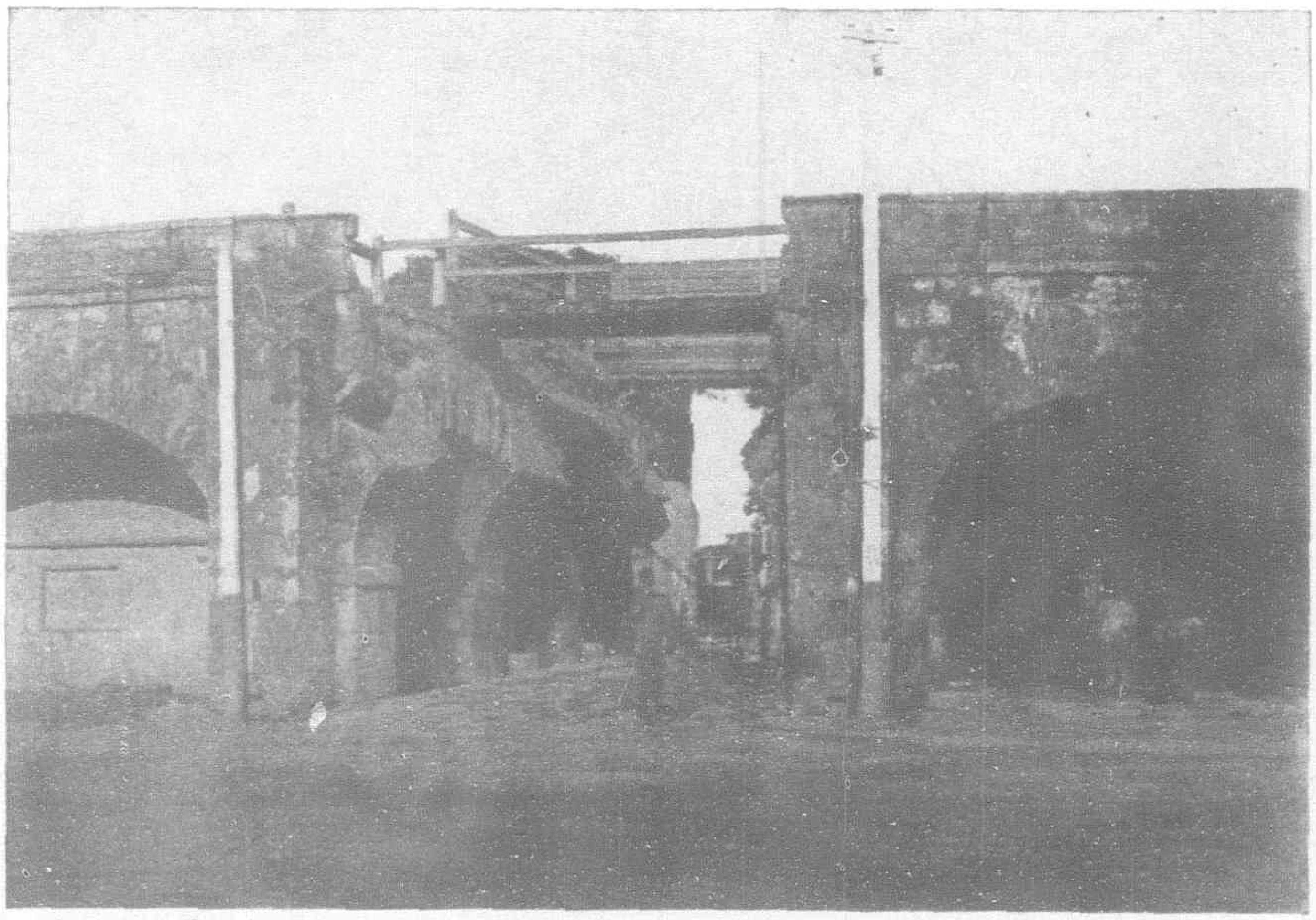
gate, extended from San Diego bastion to San Andrés. A short line of similar construction was built opposite San Gabriel bastion, northeast angle. To further develop the land front and prevent approach by the beach, a low battery, San Gregorio, had been built to the south of San Diego. This, however, played no particular part in the siege by the British (1762), and has since been demolished; the statue to Legazpi and Urdaneta now occupies its site.

The tenaille, in the form given it by Vauban, does not appear in the work of earlier engineers, but it seems to be naturally derived from the trace of Rimpler (1673), in which the "Middle flank" is analogous in function to the tenaille, and occupies its position. It adds materially to the defense and acts as a partial traverse or cover face to the escarpes of the curtain and flanks.

The necessity for its presence with the Manila walls was clearly indicated by the soft character of the tufa comprising the scarp; yet nothing of the kind has ever been added to these defenses.

Built on a trace obsolete in 1620, the land front was, in 1762, inherently weak in plan as a means of defense against an enemy possessing suitable siege artillery and a sufficient attacking force.

The first regular military organization in these islands was formed in the time of Pedro de Arandia (1754), who established one regiment composed of five companies of native soldiers, together with four companies which had arrived with the Governor from Mexico. Each company numbered three officers and 106 men. This corps, afterwards known as the King's Regiment (Regimiento del Rey), was divided into two battalions, each being increased to ten companies as troops returned from the provinces. During May, 1755, four artillery brigades were added to the establishment.



(Courtesy of Squires, Bingham & Co.)

SANTO DOMINGO GATE.

There were 16 fortified outposts in the provinces, including Zamboanga, besides the Camp of Manila, Fort Santiago, and Cavite Arsenal and Fort (1757).

This fairly represents the military situation at the time the British laid siege to the city in 1762.

As a result of the "Family Compact" and the consequent effort to diminish the power and prestige of Great Britain, war was declared by this power against France and Spain.

The British were successful everywhere. In the West Indies, the Caribbean Islands and Havana were captured with great booty by Rodney and Moncton, whilst a British fleet was dispatched to the Philippine Islands with orders to take Manila.

The evening of September 22, 1762, a British squadron of 13 ships under command of Admiral Cornish, entered the bay. Brigadier General Draper disembarked his troops next day at Fort San Antonio Abad, a bridge head about 2¼ miles south of Manila. His demand for surrender being refused, the British advanced through Malate and Ermita, the Spaniards retiring within the Walled City. The force available for attack consisted of 1500 European troops (one regiment of infantry and two companies of artillery) about the same number of sepoys, together with 700 sailors and 300 marines from the fleet. The defense could dispose of about 600 men of the King's regiment and 80 pieces of artillery with a few artillerymen, 300 Spanish militia and an unlimited supply of undisciplined natives.

The English frankly disregarded the strict rules of attack as understood in those days, and advanced to within about 250 yards of the walls, where were two churches which they seized and fortified.

One, San Juan de Bagumbayan, formerly stood near the present site of the headquarters Post of Manila, and the other, called Santiago, not far from the north band-stand on the Luneta. Behind and near this latter edifice were placed the mortar and breaching batteries (24-pdrs.).

The Spanish batteries on San Diego and San Andrés opened fire on the 24th, but with little effect. Sorties proved unsuccessful. The admiral placed his flagship opposite San Diego and stationed others off the mouth of the Pasig, to fire on Santiago and the town. The breach in San Diego wall widened day by day and the defense grew hopeless. Matters reached a crisis when natives refused to repair the fortifications, a hard labor the Europeans were unable to endure in this climate, under the circumstances. On the morning of October 6th, the breach having been reconnoitred and found practicable, a storming party of 400 men, led by Major Fell, found the breach unguarded and were able to advance unopposed up Calle Real, the street now known as Palacio. The Archbishop signed the capitulation the same day.

The Treaty of Paris (January, 1763) took no account of the Philippine situation, and Spain found herself again in possession; and again the walls received the attention of her monarch.

The Bastions, San Diego and San Andrés, with the curtain rampart, had received considerable damage during the siege, which had also developed certain weaknesses in plan.

Accordingly we find the engineer, Miguel Antonio Gomez, submitting a project for the required repairs and innovations, certain of which were approved by the royal order of November, 1766.

The Real or Royal gateway then opened at the south end of what is now called Calle Palacio. It was the gate leading to the Palace, and through which the old Governors and Archbishops made their state entries into the city. The bombardment had injured it, and for military reasons it was transferred to the middle of the curtain between San Diego and San Andrés, where it now stands.

A demi-lune, under which the present roadway inconveniently runs, protects the entrance, and is undoubtedly the work of Gomez, as are the other detached works on this front.

The new Real gate was built so narrow as to render it unsuitable for further formal entries, and these were made thereafter through the Parian gate; the street from thence being renamed Real, which it still retains.

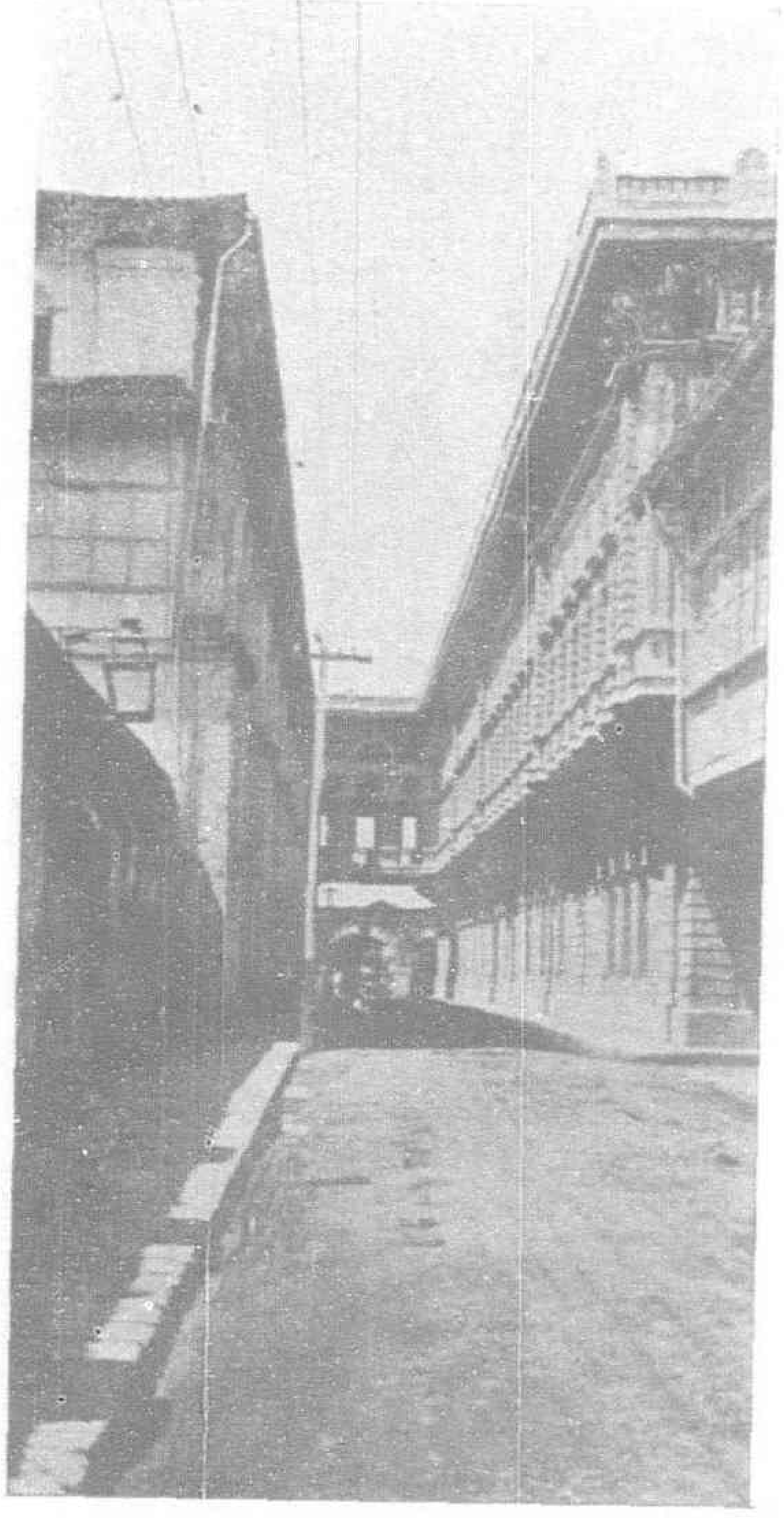
The Parian ravelin seems unquestionably the work of Gomez, as was certainly the reconstruction of the right face and flank of the San Gabriel bastion, which limits the land front on the north; the new work being still plainly visible (completed 1787). Here also appears for the first time evidence of the influence of the newer methods of fortifications. This San Gabriel flank is made perpendicular to the line of defense instead of the curtain. It seems probable also that Gomez began the work on the present moat and covered-way.

By royal order of December 16, 1796, the Governor of the Islands was authorized to carry on the fortification works described in the project presented by Francisco Sabatini, Chief of Engineers, owing to which the rampart front, facing the Pasig, was greatly modified, changed in fact to a bastioned front, resembling one by Vauban's first method but without outworks.

From the salient of San Gabriel bastion to La Maestranza, where a demi-bastion was added, the entire character of the wall submitted to complete alteration. The resulting construction is clearly indicated in the appended photograph, taken at the cross-cut made in widening the road-way at the point where the Santo Domingo gate formerly stood in the flank of the Aduana bastion. (Center of this front.)

This front is the only one affording a double tier of fire, and it is not easily understood from our present data why so elaborate a work hould have been added here, when the siege of 1762 had so clearly indicated the need of further strengthening the most exposed flank. That this need was appreciated seems plainly indicated by the construction of the Luneta redoubt, authorized at the end of the 18th century, and ordered by Governor Enrile in 1835. This work stands directly in front of the Real demi-lune, and beyond the glacis and advance moat. It is of very weak construction, even for that day, and poorly answers the purpose for which it was intended.

Sabatini continued the moat and covered-way, which was probably completed by the engineer, Rafael Aguilar, who constructed the Carlos VI battery, a short distance from Balete, and about 500 yards northeast of the Headquarters Post of Manila. This was comprised in several defensive works by this engineer, who probably erected the Plano bastion, and the outworks San Francisco and San Pedro on the bay side. He appears also to have completed the moat and covered-way.



(Courtesy of Squires, Bingham & Co.)

ROYAL STREET NEAR SANTA LUCIA GATE.

The building of this moat presented the problem of constructing a ditch in wet and rather unstable soil, close to the foot of a heavy wall, without disturbing the foundations. This appears to have been accomplished by making a long slope at the foot of the scarp, low enough to be under water, and extended to the bottom of the moat.

The rampart varies both in thickness and height. The curtain walls in Fort Santiago possess but 8 feet of soft tufa. At the west end of Calle Aduana the crest is about 20 feet above the ditch and the thickness about 45 feet of earth with a thin retaining wall of soft tufa in front. Near the Real gate these dimensions are 29 and 42 feet respectively of tufa, while at the Intendencia they are 29 and 56 feet. The parapet nowhere exceeds 16½ feet of soft tufa, with its core of earth. All bastions, in 1903, were filled with earth except the Aduana and Plano de la Santa Isabel.

A Royal order of April 23, 1872, approved the last proposed changes in the Manila fortifications, but none were carried into effect. Thus the walls and covered-ways stand today essentially as Rafael Aguilar left them.

Too weak to withstand even so modest a siege as that of the British in 1762, unless manned by superior force, these ramparts have still answered their purpose for the Spaniards.

They were undoubtedly a great safeguard against the frequent threats of the Mindanao and Sulu pirates who ventured into the bay up to within sixty years ago. Also for more than a century, the Spanish were subject to hostilities from the Portuguese; whilst the aggressive foreign policy of the Mother Country, during the 17th century, exposed them to reprisals by the Dutch fleets, which, in 1643, threatened the city of Manila. To this must be added the ever-present danger of uprising by the natives themselves.

The old ramparts have afforded a point of support and secure base but for which these islands could have hardly been held so long; and, in certain respects, their worth has not yet entirely disappeared; for no man is wise enough to say that they may not be needed again should foregoing complications create an opportunity for revolt.

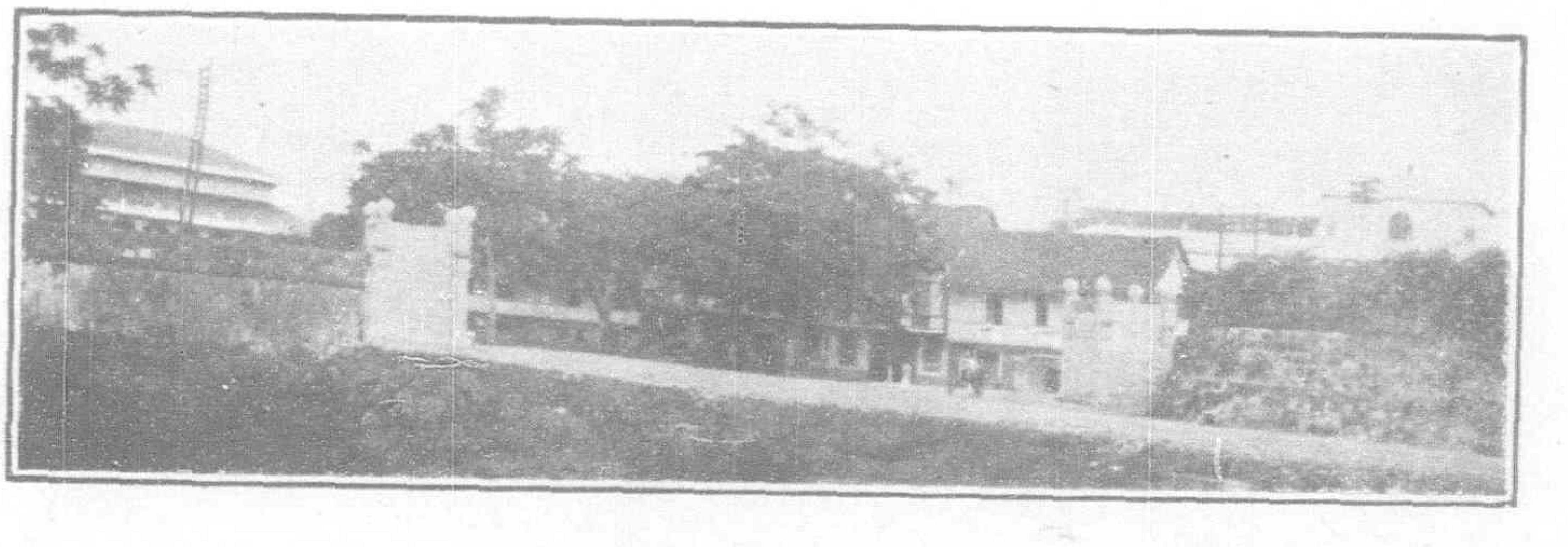
Manila, Intramuros, is situated at the mouth and on the left bank of the Pasig River, Lat. north 14° 46′, Lon. E. 120° 57′. Its encircling walls measured 2¾ miles before recent demolitions destroyed their continuity. It is a dull city, with narrow streets, bearing a heavy, sombre, monastic appearance. It has six principal gates, three on the river side, named in order from the west, Almacenes, Santo Domingo, and Isabel II; the other three on the land fronts, called Parian, Real, and Santa Lucia, a seventh ranked as a postern in Spanish times—Postigo.

Formerly, the drawbridges were raised and the city was closed and under sentinels from eleven o'clock at night until four in the morning. It continued so until 1852, when, in consequence of the earthquake of that year, it was decreed that the gates should thenceforth remain open night and day.

There exist seven bastions: Tenerias, Aduana, San Gabriel, San Lorenzo, San Andrés, San Diego, and Plano; and five ravelins: Parian, Recoletos, Real, San Pedro, and San Francisco, besides the four small bastions mentioned.

From direct examination of the walls and of maps, it would appear that there existed on the ramparts of Manila and outworks, at the time of American occupation, emplacements for 370 guns of all natures, requiring a theoretical war force of from 2600 to 5200 artillery to fully man, depending upon the number of reliefs per gun. The corresponding garrison of infantry, according to modern estimates, would number about 10,000.

We need hardly add that no such numbers, either of men or guns, ever did actually constitute the defensive force of this fortress. This statement refers, of course, only to the garrison intramuros, and does not include the field forces.



NEW GATE, CALLE VICTORIA.

FRENCH INDO-CHINA

PUBLIC WORKS EXPENDITURES.

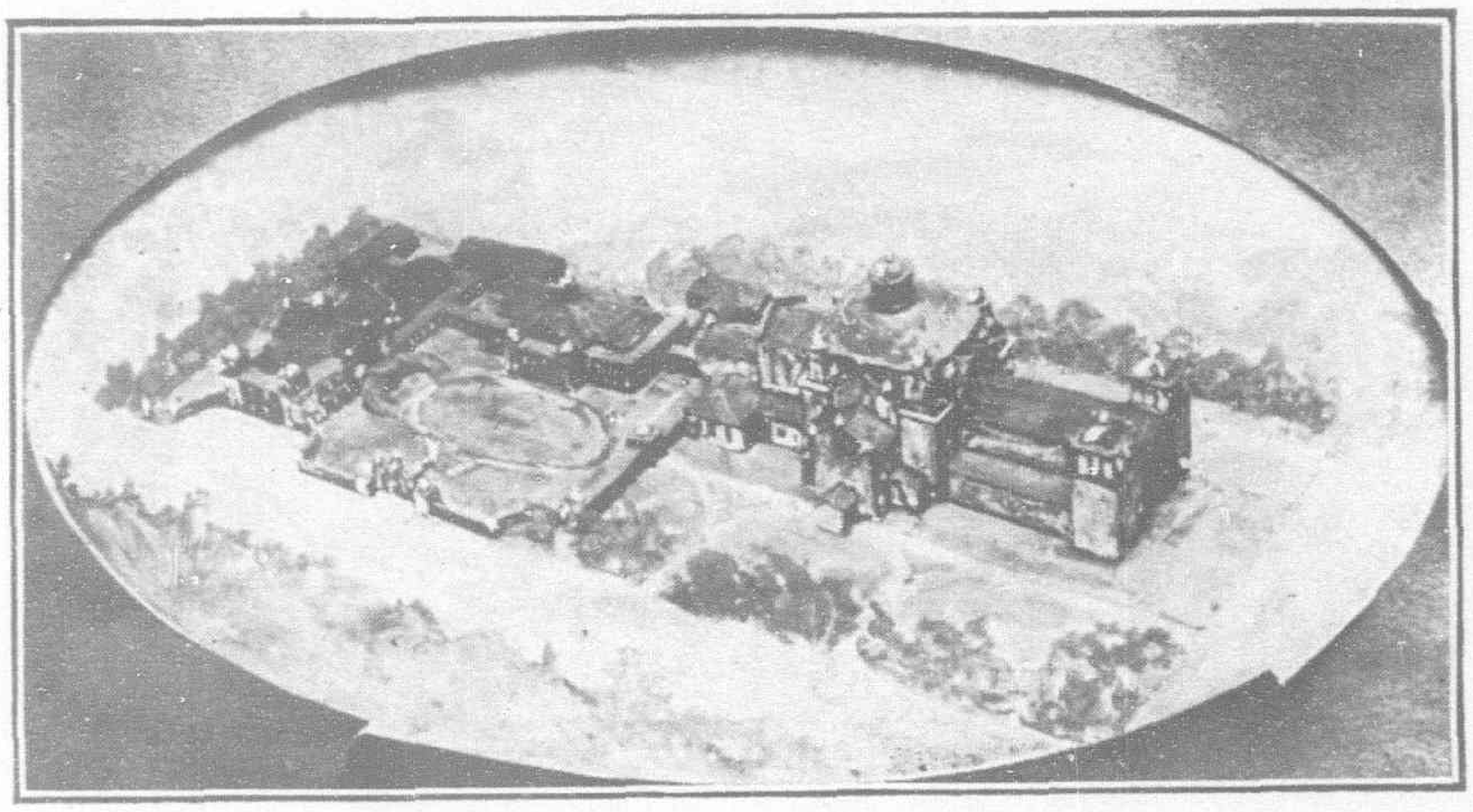
Mr. Consul Little, in concluding his report on the trade of Indo-China for 1903, says:

"I may, perhaps, usefully bring together here some facts which indicate the present condition and future prospects of the colony. The following are some of the annual charges of a striking character paid by the colony:—Subsidies to mail boats, £64,000; subsidies to other shipping, paid or about to be paid, £40,000; together, £104,000; other subsidies, £40,000; say a total of £150,000. Subsidies and bounties to planters, about $500,000; administration of Kwangchouwan, $500,000; cost of supporting 20 to 30 doctors, schoolmasters and postal agents in China and Siam; maintenance of four commercial attaches or agents in China and Siam; nearly the whole cost of maintaining an army of some 35,000 men, and four or five small gunboats, besides at least 10,000 native police with about 400 French officers; maintenance of about 4,000 French officials; interest on loans of some £6,000,000. The following are the known items of extraordinary expenditure incurred during the last few years:—Railway surveys in China, about $250,000; erection of post offices, schools, and hospitals in China, probably $100,000 to $300,000; at least $22,000 has been spent on the post office at Canton, and about $10,000 on buildings at Pakhoi; cost of Hanoi Exhibition, $2,433,000. In addition to the foregoing items should be noted the large sums spent on public works, which include, to mention only a few, about £1,000,000 on the canals in Cochin China, and probably at least an equal amount on harbor works; erection of a telegraph system of some 14,000 kiloms; erection of numerous fine barracks and public buildings; making and repair of some thousands of miles of roads (partly done, however, with proceeds of loans). The railways I do not include, as they are being built with borrowed money, although some of the big bridges, *e. g.*, at Hanoi, Saigon, and Hue, costing nearly 10,000,000 fr., have been paid for out of current revenue. The above list is by no means complete, but I think it goes a long way towards justifying the views I have expressed regarding the actual and potential value of the colony to France. People who visit the country often make the mistake of forming their opinion of it by what they see in the chief towns."

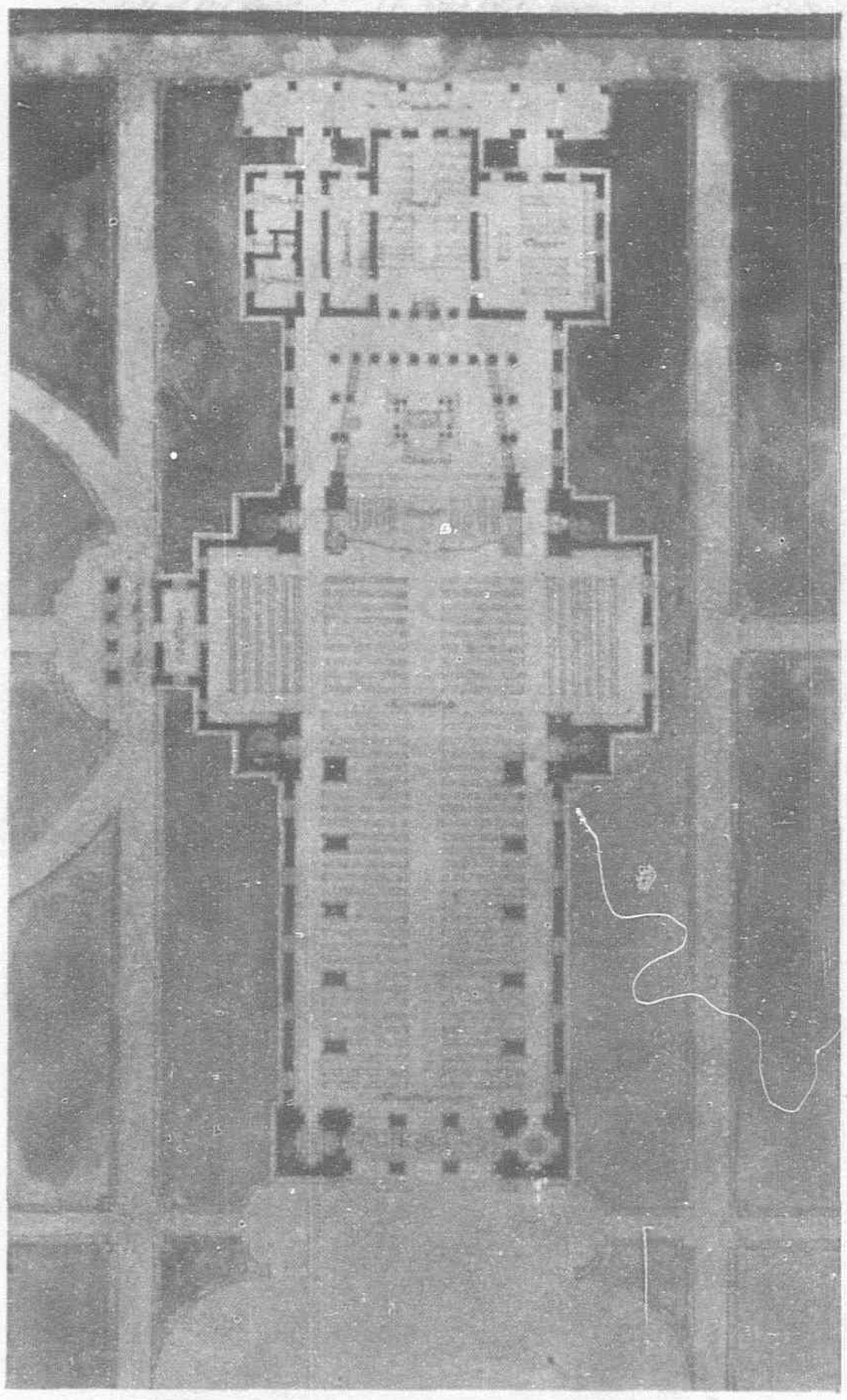
YONGAMPHO

Yongampho is a small village on the Korean side of the Yalu, situated 14 miles below Antung and 20 miles above the anchorage at the mouth of the Yalu. While the village was under Russian influence, much was heard about the Russian activity in Northern Korean controlled from that headquarter. Now that the Japanese have become the masters of the place, they have witnessed what the Russians have accomplished there and are astonished by the grandeur of their work. The Russians have built massive stone houses, amassed an enormous quantity of valuable timber, set up a saw-mill, constructed light railways, established a meteorological observatory, and have made many other improvements. All these structures are now in the possession of the Japanese. Only two days intervened between the Russian evacuation and the Japanese occupation of Yongampho, but during that time the Chinese and Koreans in the neighborhood did their utmost to destroy this valuable property, and had taken away almost everything they could place their hands on. All decorative work, doors, ceilings, floor-boards, stoves, utensils, and even the nails on the walls were carried away. The light railway was totally destroyed, and one of the brick houses gutted. This wholesale devastation is not solely attributed to the natives, for it is believed that the local Governor, who bears a Russian decoration, authorized the destruction of the property, in order to oblige his Russian friends.—*P. and T. Times.*

CATHEDRAL OF ST. MARY AND ST. JOHN



FIRST STUDY OF THE NEW CATHEDRAL.



GROUND PLAN OF THE NEW CATHEDRAL.

Among the many new imposing edifices projected for Manila, the new Protestant Episcopal Cathedral of St. Mary and St. John will grace the suburb of Ermita, in the course of the next two years. Very little noise has been made over the new edifice, but the preparatory work has been progressing steadily, and in the near future the perfected plans are expected to arrive for the main building, after which work will be prosecuted in earnest.

The necessary funds are already in the bank to start operations as soon as the plans are completed. The Cathedral building will cost $100,000, U. S. C., which has been donated to the Bishop, for this purpose, by a wealthy lady in the United States, and whose name is withheld from publicity at her own request. The plans are being prepared by Mr. Clipston Sturgis of the Boston firm of architects, Sturgis & Barton. The view shown on this page is merely the rough first model, giving only the general idea of the different structures and grounds. Until the complete plans are received, it is impossible to state just what class of materials will be employed in construction, though in all probability it will be similar to the new government laboratories, of expanded metal and cement plaster finish.

One of the most interesting features of the new group of buildings, not only from the purely architectural point of view, but from a social standpoint as well, is the new Cathedral House, now in course of erection.

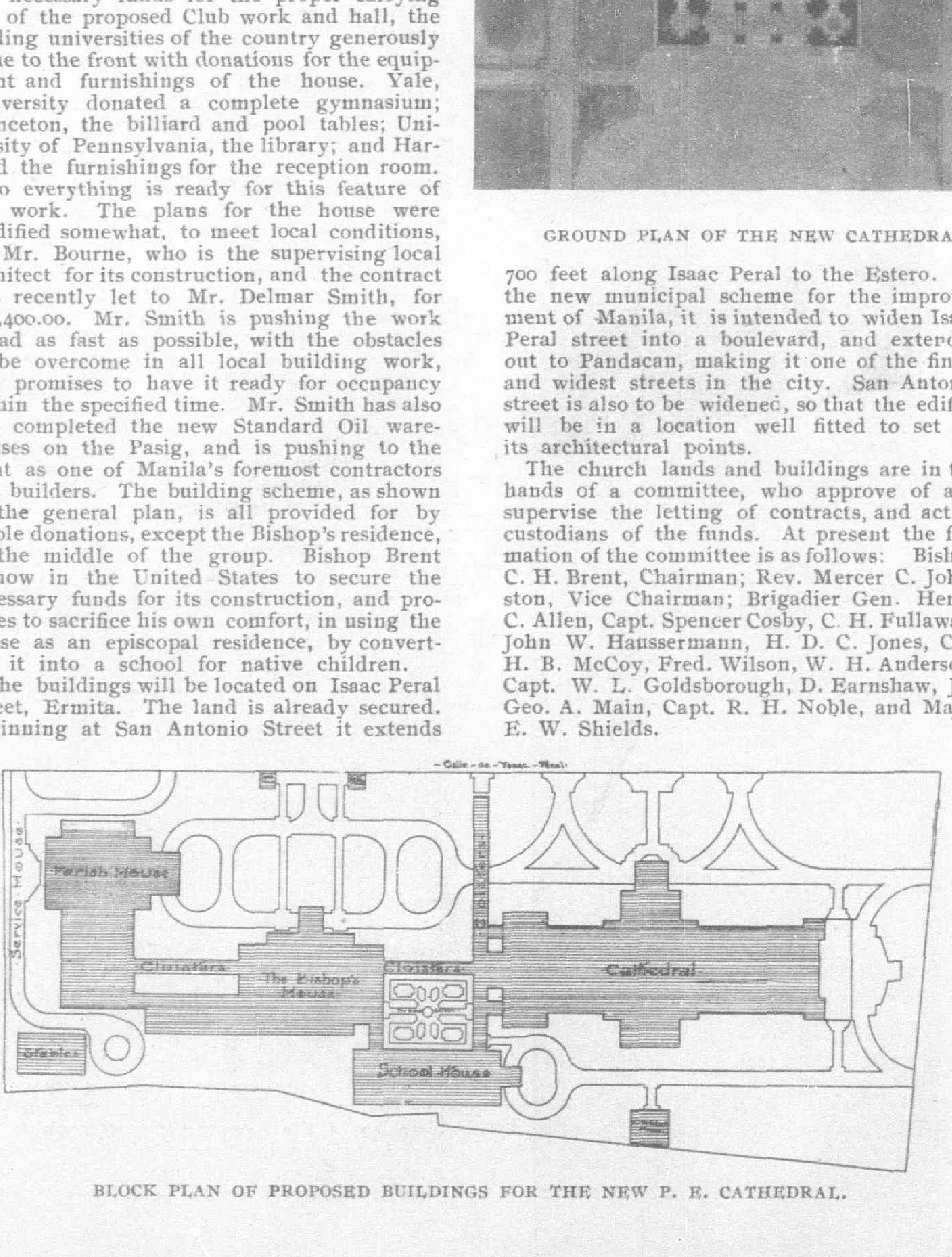
This will fill a much needed want in the lives of the younger men in Manila, whose extra time hangs heavy on their hands, and who are now forced to keep to their rooms, in lieu of a proper meeting place or general social recreation hall; for the Cathedral House will embody an entirely new feature for the Philippines. It will contain a general club and reception room, reading room and library, billiard and pool tables, gymnasium and baths, and altogether will be the most attractive social center offered by Manila. Only one other scheme of this nature is projected for the Islands. Among the many new buildings for Fort William McKinley is a Memorial Hall, the money for which was subscribed for and presented to the U. S. Government by the Daughters of the American Revolution, and it will also include the same general features. But that will not be available to the young man of Manila, as it is for the soldiers. The plan of membership to the Cathedral Club is drawn up on broad, undenominational lines, so that any young man over eighteen years of age can obtain membership, after being passed on by a majority vote of the committee having this in charge. The large meeting hall on the second floor will be utilized for church services, as soon as the building is completed, and will be continued as such pending the erection of the Cathedral proper.

The Cathedral House is to be constructed of stone up to the second story, and above will be finished in expanded metal and cement plaster. Mr. Geo. C. Thomas of Philadelphia, a member of the banking firm of Drexel, Morgan & Co., donated $25,000.00, U. S. C., for its erection. Mr. Thomas is also the Treasurer of the Protestant Episcopal Domestic and Foreign Missionary Society. In seeking the necessary funds for the proper carrying out of the proposed Club work and hall, the leading universities of the country generously came to the front with donations for the equipment and furnishings of the house. Yale, University donated a complete gymnasium; Princeton, the billiard and pool tables; University of Pennsylvania, the library; and Harvard the furnishings for the reception room.

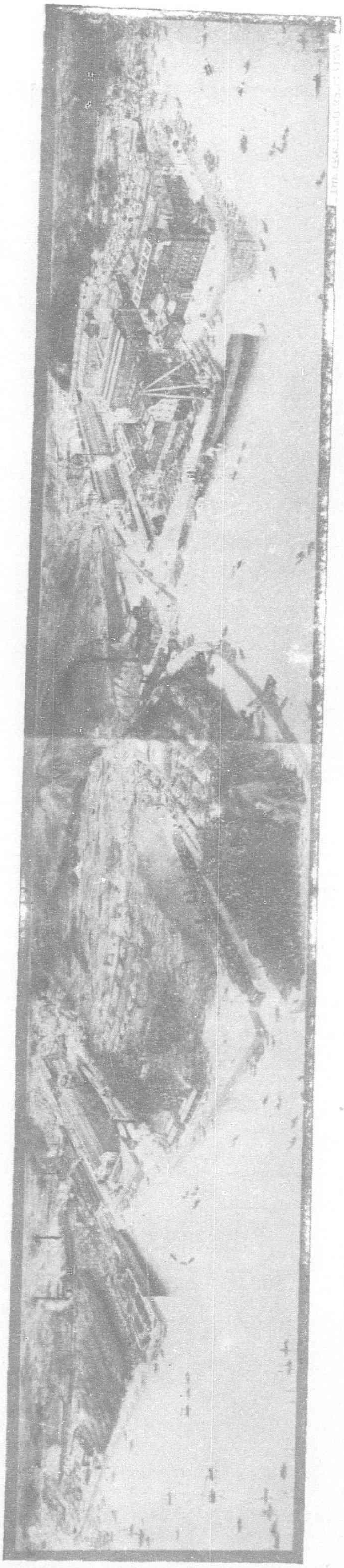
So everything is ready for this feature of the work. The plans for the house were modified somewhat, to meet local conditions, by Mr. Bourne, who is the supervising local architect for its construction, and the contract was recently let to Mr. Delmar Smith, for $23,400.00. Mr. Smith is pushing the work ahead as fast as possible, with the obstacles to be overcome in all local building work, and promises to have it ready for occupancy within the specified time. Mr. Smith has also just completed the new Standard Oil warehouses on the Pasig, and is pushing to the front as one of Manila's foremost contractors and builders. The building scheme, as shown in the general plan, is all provided for by ample donations, except the Bishop's residence, in the middle of the group. Bishop Brent is now in the United States to secure the necessary funds for its construction, and proposes to sacrifice his own comfort, in using the house as an episcopal residence, by converting it into a school for native children.

The buildings will be located on Isaac Peral Street, Ermita. The land is already secured. Beginning at San Antonio Street it extends 700 feet along Isaac Peral to the Estero. In the new municipal scheme for the improvement of Manila, it is intended to widen Isaac Peral street into a boulevard, and extend it out to Pandacan, making it one of the finest and widest streets in the city. San Antonio street is also to be widened, so that the edifice will be in a location well fitted to set off its architectural points.

The church lands and buildings are in the hands of a committee, who approve of and supervise the letting of contracts, and act as custodians of the funds. At present the formation of the committee is as follows: Bishop C. H. Brent, Chairman; Rev. Mercer C. Johnston, Vice Chairman; Brigadier Gen. Henry C. Allen, Capt. Spencer Cosby, C. H. Fullaway, John W. Haussermann, H. D. C. Jones, Col. H. B. McCoy, Fred. Wilson, W. H. Anderson, Capt. W. L. Goldsborough, D. Earnshaw, Jr., Geo. A. Main, Capt. R. H. Noble, and Major E. W. Shields.



BLOCK PLAN OF PROPOSED BUILDINGS FOR THE NEW P. E. CATHEDRAL.



THE MITSU BISHI DOCKYARD AND ENGINE WORKS, NAGASAKI, JAPAN

The Akunoura Engine Works were founded at Nagasaki, Japan, by the Shogun government about 1856. Dutch engineers were employed, and necessary machines and gear for commencing the business were imported from Holland. In consequence of this it is often noticed that a few old hands in the works still use the Dutch terms for some of the machinery. The jetty on which now stands the sheer legs were constructed at that time by means of a clumsy diving bell of Dutch make, which implement still remains at a corner of the works, in memory of the pioneers. At first the works were only on a very small scale, for repairing small steamers owned by the Shogun. About ten years later they were handed over to the superintendency of the present Meiji government, by whom great improvements were made. A large dry-dock at Tategami, now called No. 1 Dock, was constructed, and the patent slip at Kosuge, then owned by a British merchant, was purchased, and, the business becoming gradually established, a steamer named *Kosuge-Maru*, of 1,500 tons gross was built of wood, as a forerunner of the shipbuilding in this island empire.

In 1884 the ownership of the whole works was passed from the government to the present proprietors, the Mitsu Bishi Company, and three years later the first iron steamer, of about 206 tons gross, was built, followed by three steel steamers, each about 700 tons, and also a steel steamer of 1,592 tons.

The following is the list of the principal vessels built at this yard since 1898:

Ship's Name.	Gross Tonnage.	I. H. P.
T. S. S. Hitachi-Maru,	6,172	3,888
T. S. S. Awa-Maru,	6,309	4,112
S. S. Miyajima-Maru,	1,592	890
S. V. Tsukijima-Maru,	1,519	305
(With auxiliary engines.)		
S. S. Tategami-Maru,	2,691	1,774
S. S. Akunoura-Maru,	1,717	1,340
T. S. S. Tahung-Maru,	2,243	2,242
S. S. Yenoura-Maru,	645	436
T. S. S. Kaga-Maru,	6,301	5,411
T. S. S. Iyo-Maru,	6,319	5,106
S. S. Oura-Maru	712	700
S. S. Wakamatsu-Maru,	2,774	2,279
T. S. S. Tachang-Maru,	2,711	2,495
S. P. Dredger "No. 2 Dokai-Maru,"	495	400
S. P. Dredger "No. 3 Dokai-Maru,"	495	400
S. S. Daiya-Maru,	2,795	2,366
Steam Yacht Hatsukaze,	80	220
T. S. S. Aki-Maru,	6,443	5,448
S. S. Chefoo-Maru,	1,933	1,565
S. S. Niigata-Maru,	2,183	1,577
S. S. Yeiko-Maru,	1,966	1,963
S. S. Nikko-Maru,	5,400	6,500

H. I. J. M. Ss three torpedo boats, one 120 tons, the other two each 82 tons in displacement, were built, the material being given by the government.

Besides these, many smaller crafts of various types between 200 and 300 tons and a large number of steam launches were built.

The works have of late been very much improved by extensions, new buildings being erected and large additions made to the machinery, all of the latest type, the premises covering at present about 80 acres.

The following will give a good indication of the capacity of the works: One pair of tripod steel shear legs of 100 tons capacity on the jetty for landing or shipping of heavy boilers and machinery, the depth of water under the shear legs being 25 feet.

BUILDINGS.

A machine shop has been lately built fitted with one 20-ton, one 15-ton, and two 5-ton overhead traveling cranes electrically driven; over 40 of the newest type of machines of various description, some of which deserve special mention, and include: a planing machine to plane 21 feet horizontally and 18 feet vertically; 54-inch center crank shaft lathe; 30-inch center gap lathe, the height of center in gap being 6 feet 6 inches; two lathes 22 inches centre shaft lathe, having a common center line to turn 67 feet in maximum length; one 5½-inch spindle double universal horizontal drilling, tapping, boring, studding, and milling machine to move 10 feet vertically and 15 feet horizontally, and a cylinder boring machine to bore out cylinders up to 100 inches diameter.

The boiler shop has of late been extended and many machines added, including electric shell drilling machines, one 40-ton electric traveling crane, one 40-ton hydraulic crane, and also one 105-ton hydraulic riveting machine; also a plate roller which rolls a plate up to 2 inches thick by 11 feet 9 inches wide.

The blacksmith shop is furnished with eight steam hammers, ranging from 50 pounds to 7 tons, with sufficient hearths, furnaces, and cranes, etc., which enable the works to undertake any forgings up to 15 tons.

The foundry has lately been greatly extended and is capable of turning out iron casting of 50 tons, if necessary, in one casting. In the central building there are two electrically-driven overhead traveling cranes whose combined lift is 50 tons, and besides these five 3-ton swinging cranes in the wing.

The erecting shop is of ample size, fitted with overhead traveling cranes, one of these being 30 tons in capacity.

An electric shop is also installed with ample plant to execute electrical repairs, etc.

ELECTRIC POWER INSTALLATION.

Steam as a motive power has been superseded by electricity, which is now being used on a very extensive scale throughout the works, not only for lighting, but also for driving machinery.

The Akunoura power house has been extended and equipped with two 25-Kw. Edison shunt dynamos, one 35-light Brush arc dynamo, and two new sets of 225-Kw. compound dynamos of the General Electric type, coupled direct to McIntosh-Seymour vertical cross-compound engines, have been lately added. At Tategami a new power house has been built, furnished with two 100-Kw. Seimen compound dynamos coupled direct to William's central valve compound double-crank engines, and one 25-Kw. shunt dynamo.

The Tategami shipyard, including joiner shop, saw mill, carpenter shop, galvanizing shop, machine shop, blacksmith shop, and molding loft, etc., has been greatly extended and improved, and is now capable of turning out ships of a gross tonnage of over 20,000 in one year. It has eight building berths ranging from 700 feet to 170 feet; all departments are well laid out with rails, turntables, portable cranes, etc.

Pneumatic tools have been tried on a small scale, as an experiment, and are to be installed at Tategami works generally.

DOCKS AND PATENT SLIP.

The works are equipped with two stone built drydocks and one patent slip. Besides these, one very large dry-dock is in course of construction, which is now very nearly completed.

The following are the particulars of the dock and slip:

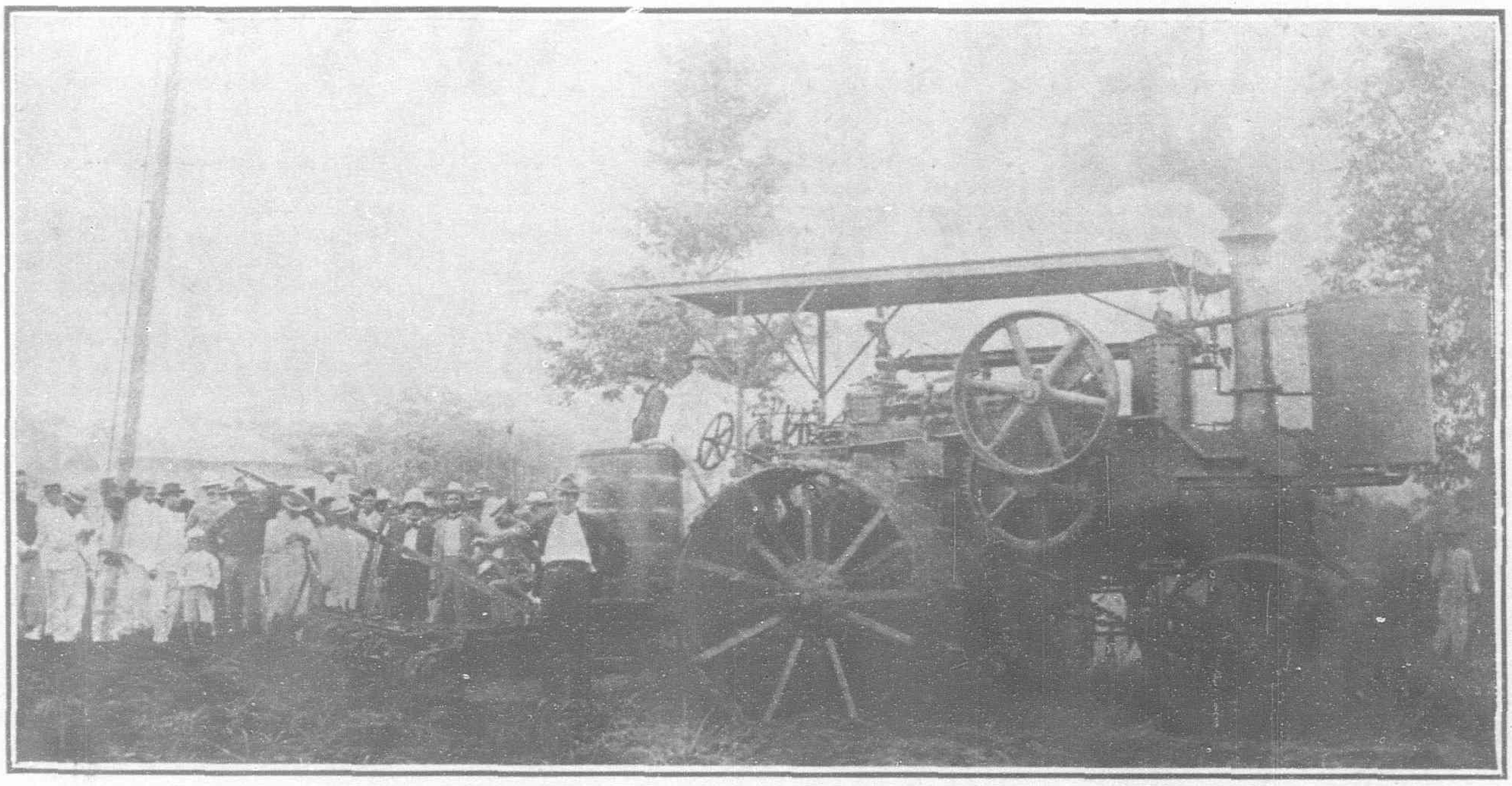
Name of Docks or Slip.	Length of Keel Blocks.	Breadth at Entrance				Depth of Water on Blocks at Ordinary Spring Tide.	
		On Top.		On Bottom.			
	ft.	ft.	in.	ft.	in.	ft.	in.
No. I....	510	89	0	77	0	26	6
No. II...	350	66	0	53	0	24	0
No. III..	714	96	7	88	7	34	6

(The No. III. Dock is in course of construction.)

Patent Slip.—Length of rail, 750 feet; width of rail, 30 feet.

The slip is capable to take up ships up to 1,000 tons.

The company also own a salvage steamer of 712 tons and 12 knots speed, specially built



AMERICAN STEAM PLOW OUTFIT: BUFFALO PITTS ENGINE AND PARLIN & OLLENDORF GANG PLOW.

for the purpose, fitted with all the necessary pumps and gear of the most powerful description; a large number of experienced workmen and divers are always ready at short notice to undertake salvage operations.

SCHOOL, HOSPITAL, AND BENEFIT ASSOCIATIONS.

The works' school, which has been opened four years, has an accommodation for five classes, totaling 250 boys each year, allowing 50 new candidates to enter and 50 graduating, but at present it is attended by 218 boys, divided into five classes. This institution is free to the general public through the generosity of the owners of the works.

The yard has its own hospital for wounded, to accommodate about 50 patients, in which men are treated at the expense of the company. The company has also its own water supply for the daily use of the works and for fire service, the reservoirs containing about 15,000 tons of water. The number of workmen employed is from 5,000 to 5,600 daily on pay sheets.

For the benefit of the workmen there is an institution called the Shokko Kyugo Ho, enforced since the end of the year 1897 with satisfactory results. This institution is based upon the principle of an assurance system, each employee contributing a certain proportion of his wages on each pay day, to which the employer contributes a like amount. The benefit accruing to the workman varies from 50 to 2,500 yen (a yen is equivalent to about 50 cents), according to class and rate of wages, and this is applied to the families of those who have died of wounds received on duty, to those incapacitated through injury received at work, and to those who, retiring from old age or other reasons, are entitled to receive pensions from this fund according to their grade of work.

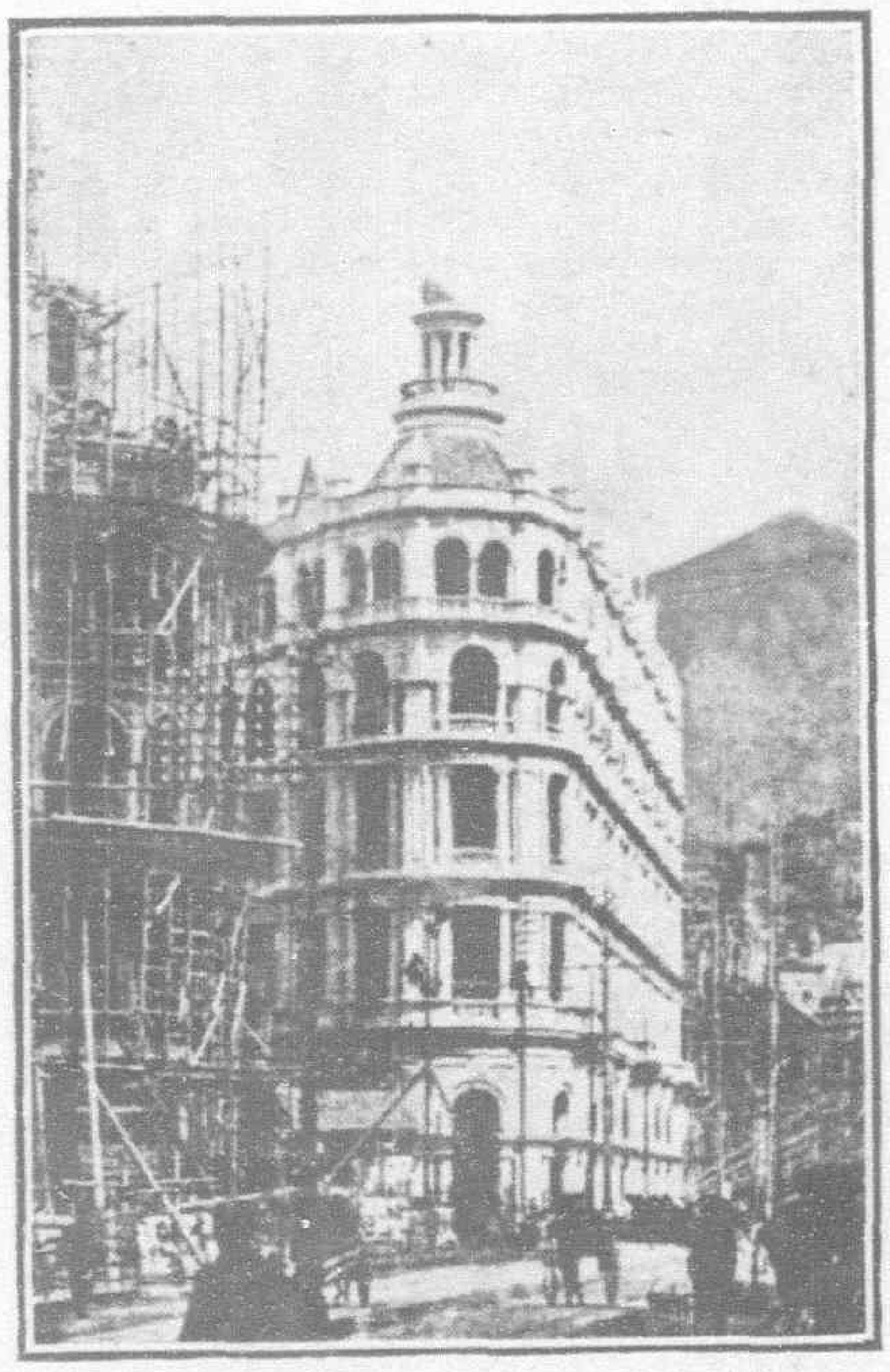
To encourage thriftiness amongst the workmen a savings-bank system was formed and put in force on October 1, 1902. The system requires, first of all, that one "kuchi," or a deposit of one yen, shall be made by each depositor on each pay day, and this amount is kept in a separate account, and when the amount of the principal and interest shall have reached 300 yen, the savings for one "kuchi" is expired, and 50 yen extra to each 300 yen will be given as an encouraging subsidy or bonus.

In conclusion it should be stated that the capacity of the works is ample to undertake any repairs or to dock any vessel afloat; for this purpose a large supply of materials of every description is always kept in stock. Further improvement and extensions are to be carried out both at Akunoura and the Tategami, which, on completion, will still further add to the present capacity.

ALEXANDRA BUILDINGS, HONGKONG

We reproduce from the *South China Weekly Post* a view of the magnificent new office building recently completed in Hongkong.

It is situated at the intersection of Des Voeux and Chater Roads, one of the best commercial locations in the city. Every available office and floor space was quickly taken up by leading firms. Messrs. A. S. Watson & Co., the largest drug merchants and aërated wated manufacturers in the East, occupy the apex of the building on the ground floor, which is an excellent location for their business. Other leading tenants of the new building are:



Messrs. Powell, Ltd., and Gaupp & Co., who also occupy space on the ground floor. The offices on the first floor are occupied by Messrs. Ewens & Harston, Solicitors, Dr. Swan, Mr. E. C. Ray, Powell Limited (furniture show rooms), Sun Fire Insurance Company of Canada, and the China Mutual Insurance Company. On the second floor Messrs. Watson, J. D. Humphreys & Son, Humphreys Estate and Finance Company, Tramway Company, Drs. Stedman, Rennie & Harston, the North China Insurance Company and the Holland and China Trading Company have their offices, while on the third floor are Messrs. Palmer & Turner, Linstead & Davis, Chadwick Kew, W. D. Draham, Drs. Jordan & Gibson, Java, China and Japan steamer line; and, on the fourth floor, the Young Men's Christian Association's Rooms are situated. A portion of this floor has been sub-let.

NEW STEAM PLOW

The first steam plowing outfit brought to the Philippines was exhibited during the month to a large gathering of planters and prominent officials. The site chosen for the tests was the large field in front of the Agricultural Experiment Station in Malate, which offered favorable conditions for performance of the outfit.

The engine is a 10-ton road locomotive, manufactured by the Buffalo Pitts Co., of Buffalo, N. Y., which drags a six gang plow, from the works of the Parlin, Ollendorf Co., of Canton, Ohio. It was brought to the islands by Mr. C. E. Helvie, the agent of the manufacturers, on an order from the Concepción Farming Co., of Stotsenberg.

The plow fully demonstrated its capabilities during the exhibition tests at the Experiment Station. It was first set for ordinary work, turning over the soil to a depth of six inches, which was gradually increased until the ground was broken to a depth of 12 to 13 inches. The speed of the engine was varied from time to time to show the native planters just what could be accomplished. The series of tests were entirely satisfactory, fully convincing the planters of the superior merits of the new machine over the old methods.

For agricultural work in the Philippines, in rice, corn, cane, and other lands, there is nothing that can compare to a steam plow for preparing the soil for cultivation, especially so from the fact that now the planters are entirely dependent on the slow and cumbrous carabao. The scarcity of these animals, and their liability to the ravages of the rinderpest and other fatal epidemics, makes it imperative that some step be taken to preserve the agricultural industries of the archipelago. The prosperity of the islands depends largely upon the successful pursuit of agriculture, and any improvement towards this end should be welcomed by all. The interest taken in the matter was evidenced by the large gathering of wealthy native planters, and, from their favorable comments, it is certain that a number of other orders will follow.

FINANCIAL NEWS.

HONGKONG ELECTRIC CO., LTD.

Report of the Board of Directors to the fifteenth ordinary yearly meeting of shareholders, held at the Company's Offices, No. 4 Queen's Buildings, at 12:30 p. m., on Saturday, 16th July, 1904:—

Gentlemen: Your Directors have the pleasure to submit the accompanying state of the company's accounts for the year ending 30th April, 1904. The balance at credit of profit and loss account is $93,969.77; after deducting Directors' fees ($3,000), there remains the sum of $90,969.77 available for appropriation, and your Directors recommend that this be disposed of as follows: To pay a dividend of 10 per cent—say $1.00 per share on 30,000 fully paid shares, $30,000.00; say 50 cents per share on 30,000 part paid shares, $15,000.00; to write off plant account for depreciation, $44,222.11; to carry forward to next account, $1,747.66; and making a total of $90,969.77.

The manager reports that the number of lamps, fans, and motors connected to the company's supply service on the 1st June was equivalent to upwards of 27,500 lamps of 8 candle power. 85 arc lamps are maintained by the company and 12 electric lifts are being operated by the power service. During the year 2 additional boilers have been laid down at the company's works, where provision has also been made for the erection during the summer of an additional 250 K. W. steam alternator. It has been found necessary to lay a duplicate cable, as far as the junction of Castle and Robinson Roads, for the lighting service in the upper parts of the city, and this work will shortly be completed.

MEIJI FIRE INSURANCE COMPANY

Report of the Meiji Fire Insurance Co., Limited, Tokio, Japan, presented at the Fourteenth Annual Ordinary Meeting held at the Company's Head Office, No. 1, Yayesucho Itchome Kojimachi-ku, Tokio, on Wednesday, April 20:

The Directors have the pleasure to lay before the shareholders a statement of the Company's accounts for the year ending 31st March, 1904.

The premiums collected during the year, less reinsurances, amount to Yen 599,121.715 and total income to Yen 1,126,599.706, showing an increase of Yen 131,948 074 over the previous year.

The total losses, less reinsurances, amount to Yen 358,996.860 showing an increase of Yen 162,998.128 over the previous year.

The balance of the working account for the year amounts to Yen 562,443,222: less reserve for unexpected risks at the 31st March, 1904, Yen 439,648,686; net profit of the year, Yen 122,794.536.

The Directors recommend the sum of Yen 122,794.536 to be appropriated in the following manner:—

Dividend of 17 per cent to shareholders, Yen 42,500.000; to reserve fund, Yen 80,294.536; making a total of Yen 122,749.536.

TIENTSIN WATERWOKS CO., LTD.—The report of the Tientsin Waterworks Co., Ltd., for the past year shows, after paying an interim dividend of Tls. 4 per share, and writing off for depreciation, a divisible sum of Tls. 11,780. Tls. 1,617 go in directors' and auditor's fees, Tls. 7,952 in paying a final dividend of Tls. 4, and the balance, Tls. 2,211, is carried forward.

HONGKONG AND SHANGHAI BANKING CORPORATION

The Directors of the Hongkong and Shanghai Banking Corporation will recommend at the forthcoming meeting a dividend of £1.10 per share. Add to the Reserve Fund, $500,000; write off Property Account, $200,000; and carry forward about $1,500,000.

THE SHANGHAI MERCURY, LTD.

Report and accounts for the twelve months ending 30th April, 1904, presented at the Fourth Annual Meeting held at the Head Office of the Company on Thursday, 30th June, at 1.30 a. m.:

The Directors, in submitting their Fourth Annual Report and the Audited Statement of the Company's Accounts, made up to the 30th April last, congratulated the Shareholders upon a fairly good year's working.

PROFIT AND LOSS ACCOUNT:—After paying an interim dividend of 5 per cent on the 30th November last, writing off Tls. 3,944.51 for depreciation, etc., and providing for Directors' and Auditor's fees, the balance to the credit of this account amounts to Tls. 4,558.11, out of which the Directors proposed to pay a final dividend of 4 per cent, absorbing Tls. 4,200.00 and to carry forward the balance of Tls. 358.11.

Helm Bros., Ltd., Yokohama, have declared an interim dividend for the first half of 1904 of 7½ per cent, free of income tax.

THE OSAKA SHOSEN KAISHA

It appears that the business of the Osaka Shosen Kaisha has been very prosperous of late. The company's receipts from January to May were returned as Yen 3,061,742, while the state subsidy, which the company was granted for the five months, amounted to Yen 419,105, making a total of Yen 3,480,847. Below are the figures of the company's business receipts and state subsidy, taken monthly since January:—

	Receipts. yen	Subsidy. yen	Total yen
January	408,040	91,549	499,589
February	497,203	64,003	561,206
March	624,443	96,993	721,436
April	732,960	79,904	812,864
May	799,096	86,656	885,752
Total	3,061,742	419,105	3,480,847

The business expenditure of the company for the five months is estimated at Yen 2,642,121, and the net profits for the same period reached the figures of Yen 838,726, as shown in the following table:—

	Receipts. yen	Expenditure. yen
January	499 589	434,768
February	561,206	467,610
March	721,436	534,846
April	812,864	570,219
May	885,752	634,678
	3,480,847	2,642,121

Such being the actual business condition of the company they will be able to declare a dividend at the rate of 10 per cent. per annum for the first half of this year, and carry an ample amount over to the next business term.

P. AND O. S. N. COMPANY

Half-yearly report to March 31st:

The tonnage is 366,937 tons. The four steamers of the *Moldavia* class are all now fully at work, and their performance has already established their reputation. The *Bombay* and *Shanghai*, like their sister vessel the *Canton*, have been sold, because, as cargo steamers, they were not equal to the requirements of the company's work in the present day. The *Victoria*, *Britannia*, *Arcadia*, *Oceana*, *Peninsular*, and *Oriental* are being extensively refitted and improved to enable them to cope with the new mail service which will commence next year. A contract has been made with Messrs. Caird & Co. for the construction of a mail and passenger steamer of 10,000 tons of the *Moldavia* class. This will be the fifth vessel of this type included in the fleet. A tender has been accepted from Messrs Barclay, Curle & Co. to build two 10,000 ton cargo boats, identical in all respects with the three vessels of the *Palermo* class.

The Company have still several ships engaged in transport work, the *Assaye*, *Plassy*, *Sicilia*, but their engagement will end next month.

Mail Contract.—The present mail contract comes to an end early next year. After prolonged negotiation the directors have agreed with the Postmaster-General for a new contract to carry on the same services as at present, but with a considerable acceleration, during a period of three years from February, 1905.

The most important feature in the new service will be the acceleration of the Indian mails by 24 hours, and their regular delivery at Bombay in a little over 13 days from Charing Cross. This, and the other improvements stipulated for (which include a more rapid transit, both of the Australian and China services), will involve a large additional expenditure, towards which the Post Office will contribute £10,000 a year, being an addition of that amount to the present subsidy, but which, in certain eventualities, may hereafter be reduced.

The company spent a million and a half sterling last year in the construction of only four new steamers, in anticipation of a renewal of the mail contract, and, considering the large capital embarked altogether in the postal service, the directors would naturally have preferred a longer term of contract. But the impossibility of arranging the future conditions of the Colonial portion of the service with the Australian Commonwealth rendered a tentative arrangement necessary in the judgment of the Post Office, and to this decision the directors loyally subscribed by offering the most advantageous service within the company's power.

Summary.—The return of troops from South Africa practically ended the transport service. The return of a number of vessels to their normal employment has, however, been the means of improving the general freight earnings to a considerable extent, notwithstanding the continuance of very low carrying rates. The passenger receipts contrast unfavorably with the figures of last year, partly due to the fact that the comparison is made with a period which embraced the traffic arising from the India Durbar, and partly to the effect of a lower tariff (*inter alia* the removal of the coal surtax) and the extension of the company's return ticket system, of which the public have largely availed themselves.

The Eastern trade has shown no greater buoyancy, as regards rates of freight, than for some time past. Certain circumstances have proved additionally unfavorable, such as the disturbance in the export cotton trade from Manchester and the cessation of the trade between Bombay, China, and Japan, due to the inflation of cotton prices, and to the war between Russia and Japan. The company's intercolonial steamers have, therefore, not been able to find their usual employment. Coal will prove slightly dearer during the currency of the present financial year, and the labor charges continue, in every direction, on a very heavy scale.

A JAPANESE-AMERICAN BANK

A news agency reports that Mr. Soichiro Asano, in co-operation with a certain American Bank at San Francisco, contemplates establishing a bank there in order to facilitate the commercial business between Japan and the United States. The capital of the new bank will be $10,000,000, half of which will be raised in each country.

PACIFIC MAIL STEAMSHIP CO.

The report of the operations of the Pacific Mail Steamship Company, for the year ended April 30, shows:

Receipts—	1904.	1903.	*Increase.*
From steamers	$3,439,113	$2,677,913	$761,200
C. A. Mails	15,180	14,510	670
Rents and collections.	136,254	138,428	2,826
Income from Invest..	6,740	1,510	5,230
Exchange.............	4,479	145	4,334
Total Receipts...	$3,601,766	$2,827,506	$744,260
Expenses—			
Steamers...............	$2,276,963	$1,890,628	$386,335
Agencies..............	437,137	347,598	89,539
General expenses.....	83,222	72,054	11,168
Miscellaneous	393	1,505	1,112
Insurance.............	145,019	116,809	28,210
Interest on loans	80,972	75,809	5,163
Gen. Av'ge expenses.	16,341	......	16,341
Total............	$3,040,047	$2,504,403	$535,644
Net earnings.....	$561,719	$323,103	$238,616
Dep'n and repairs....	314,823	314,823	
Surplus	$246,869	$8,280	$238,616

President E. H. Harriman, in his preliminary report, says:

"The rates on all over-sea carryings have been unusually low during the entire year everywhere. The company had also to meet severe competition to the ports served by its steamers, and a further shrinkage in its revenue resulted from the regulations of the Government of the United States of America in respect of Chinese immigration. The sum of $314,823 24 has, as customary, been charged to the year's expenses for general and extraordinary repairs of steamers. After charging this account with expenses payable therefrom, there remained $1,027,855.49 to the credit of this fund at the close of the year.

"The insurance on the company's steamers was renewed and the premium chargeable against this year's operations ($145,019.51) charged to the year's expenses. The increase in this expense results from a full year's charge for insurance on the steamers *Korea* and *Siberia*. The money borrowed to meet payments on the new steamers was reduced by $501,244.81 during the year. With the exception of this indebtedness, amounting on April 30, 1904, to $1,326,163.02, the company is free from floating debt other than current expenses. The cash on hand in New York, San Francisco and London, April 30, 1904, amounted to $48,638.37."

At the election held, the following directors were chosen: Geo. J. Gould, E. H. Harriman, Edwin Hawley, Geo. H. Macy, Ogden Mills, Russell Sage, R. P. Schwerin, James Speyer, and Paul M. Warburg.

INDO-CHINA STEAM NAVIGATION COMPANY, LIMITED

Report and statement of accounts for the year 1903:

The keen competition experienced throughout the year has, as in the preceding year, adversely affected the earnings of the Fleet; and other circumstances, such as the strained condition of political affairs and extreme financial pressure amongst the Chinese commercial community, have tended to restrict business and to limit the movement of merchandise. Freights consequently ruled low, resulting in a smaller revenue than for some years.

The Board have satisfaction in reporting that again the Company has been fortunate in escaping any serious casualty, and that the Underwriting Account has resulted in a substantial gain. With a view to limiting the risk, chiefly upon the larger steamers, cover has been provided, by which, in the event of a total loss, the claims upon the Account would be materially reduced. The Board have therefore felt justified in transferring £65,291 7s. 2d. to the Revenue of the year, leaving the Underwriting Account with a credit balance of £205,000.

After making due provision for Depreciation on the Fleet (£60,953) and for Interest, General Charges, and Income Tax, the Revenue Account, with the transfer above referred to, shows a balance of £30,647 16s. 8d., from which the Directors recommend payment of a Dividend of 5 per cent, free of Income Tax, which will absorb £24,794 10s., and leave a balance of £5,853 6s. 8d. to be carried forward to 1904.

LONDON, 30th May, 1904.

CANTON LAND CO., LTD.

The Sixth Ordinary General Meeting of shareholders in the Canton Land Company, Limited, was held on Saturday morning at the company's offices.

The chairman said: "There is nothing of special interest to remark on in regard to the year's business. The collection of rents has gone on satisfactorily, but you will notice that in these accounts we have written off rents due in previous years which, owing to the old trouble with the Kaifong, we have been unable to get in.

"I am sorry to say that I fear the rent from the jetty will be considerably reduced in future, as the access to it is being impeded greatly by the steamers lying across our property at the wharves on either side. We are of course doing our best to obtain compensation for this.

"We have not recommended a dividend this year, as we are negotiating with the authorities at Canton for the reclamation of the unfilled portion of our land, and, if this goes through, we shall require all the money we have in hand to pay for the work."

THE TOKYO DENSHA TETSUDO KAISHA

The ordinary general meeting of the shareholders was held on the 24th of June. The Directors proposed that the dividend be paid at the rate of 11 per cent for the year. At the extraordinary meeting which followed, the shareholders were asked to approve of raising the capital from 5 to 6 million yen, a new share to be allotted to every holder of five old ones. The additional capital is to be spent in paving the lines, as are those of the Shigai Tetsudo, buying more cars and other improvements.

HOKKAIDO RAILWAY CO., JAPAN

The Hokkaido Railway Company has announced the issue of debentures of the nominal value of 1,160,000 *yen*, bearing interest at 8 per cent per annum, payable half yearly. The debentures are of the denominations of 100 *yen*, 500 *yen*, 2,000 *yen*, and 5,000 *yen*, and will be offered at 98 *yen* or upwards per 100 *yen* face value. The debentures are to be redeemed in thirteen years, commencing from August, 1906. The subscription list is to be opened on the 25th July and closed on the 10th August, inclusive. It may be added that the Railway has outstanding debentures to the amount of 2,500,000 *yen* against an authorized capital of 6,340,000 *yen*, of which latter 5,386,960 *yen* is paid up.

MITSU BISHI BANK

The half-yearly general meeting of the Mitsu Bishi Banking Department took place in the building of the establishment on the 8th of July, when the following accounts for the first half of this year were presented and passed:—

	Yen.
Net profit	881,861.80
Brought forward from last account.	1,753,283.51
Total	2,635,145.31
Expenditure and interest...........	738,456.15
To set aside as profits................	50,000.00
Carried forward to next account.	1,846,689.16

As will be seen from the above, 50,000 *yen*, or ten per cent of the net profits, has been set aside as dividend, and it is stated that the profit for the term showed an increase of 173,743 *yen*, compared with the first half of last year.

TOKIO STOCK EXCHANGE

A general meeting of the shareholders of the Tokio Stock Exchange was held on the 20th of July. A dividend for the last half-yearly term will be declared at the rate of 17 per cent. per annum.

YASUDA BANK

The half yearly general meeting of the Yasuda Bank, Tokio, was held on the 3rd of July, when the reports and account for the first half of this year were presented and passed. The following are the accounts:—

Net profit.	186,956.180
To reserve	100,000.000
Special reserve.....................	30,000.000
Dividend (5% per annum)...	50,000.000
Bonus to officials......	6,956.180

Compared with the second half of last year, the net profit for the present term shows an increase of 3,059 *yen*.

MITSUI GINKO

The Mitsui Ginko shows a great increase of business in the past six months. The profit of the bank for the half-year just ended amounted to Y395,383 (as against Y236,496 for the first six months of last year) or a total of Y575,300, adding the amount brought over from last account. Of this sum Y100,000 was set aside as bonus to employees, and Y250,000 placed to the reserve, a balance of Y225,379 being carried forward to next account. The paid-up capital of the bank is Y5,000,000, with a reserve amounting to Y5,600,000. The deposits now amount to Y41,710,000, as against Y37,233,553, at the end of June last year.

BELL'S ASBESTOS EASTERN AGENCY, LTD.

Following is the ninth annual report:—

The directors herewith present to the shareholders the report and accounts, duly audited, to the 31st December, 1903, showing a profit of £797 13s. 10d.

To this has to be added the sum of £350, carried forward from the last account, making a total of £1,147 13s. 10d.

This amount the directors recommend should be allocated as follows: To pay £500 off the debenture bond; to write £300 off "Purchase of Trading Rights," being 10 per cent of that sum; to pay a dividend of 4 per cent for the year, free of income tax, absorbing £185 19s. and to carry forward £161 14s. 10d. to the next account.

THE GERMAN-ASIATIC BANK

BERLIN, June 28.—The German-Asiatic Bank at its annual general meeting has decided to increase its capital to 2,500,000 taels. New shares will be offered to old shareholders at the rate of 115.

S. C. FARNHAM, BOYD & CO., LTD.

Report of the Board of Directors at the fourth annual general meeting held at the Head Office, 26 Broadway, on Tuesday, the 19th day of July, 1904, at 5 p. m.:

To the Shareholders of S. C. Farnham, Boyd & Co., Limited:

Gentlemen,—The Directors have pleasure in submitting to you their Report, with Statement of Accounts made up to the 30th April last, which they trust will prove satisfactory to you.

The net profits, including the amount brought forward from last year, and after paying all charges and allowing for all known liabilities, amount to Tls. 760,553.18.

After allowing for an interim dividend of 5 per cent on 55,200 shares, paid in December of last year, which absorbed Tls. 276,000, there remains for distribution the sum of Tls. 484,553.18. With this amount the Directors propose to deal as follows:

	Tls.
A final dividend of Tls. 7 per share...	386,400.00
Add to reserve fund	50,000 00
Amount to be carried to new account...	48,153.18
	Tls. 484,553.18

Mr. Jas. R. Twentyman has returned from leave, and Mr. David Cranston is at present at home on a holiday.

In accordance with § 98 of the Memorandum and Articles of Association, one of the Directors, Mr. H. von Rücker, retires, but, being eligible, offers himself for re-election.

The accounts have been audited by Messrs. Geo. D. Scott and J. D. Thorburn, who retire, but, being eligible, offer themselves for re-election.

PROFIT AND LOSS ACCOUNT.

	Tls.
1903. December 22nd.	
To 5 per cent interim dividend on 55 200 shares	276,000.00
1904. April 30th.	
To balance	484.553.18
	Tls. 760,553 18

	Tls.
1903. May 1st.	
By balance carried forward	43,124.22
1904. April 30th.	
By transfer from working account	717,428.96
	Tls. 760,553.18

BALANCE SHEET.

Capital account.

ASSETS.

1904. April 30th.	Tls.
To Old Dock:	
"Old Dock," Property with Boilers, Pumps, Moorings, Shear Legs, Launching Ways, Capstans, etc., 16*m*. 5*f*. 2*l*. 5*h*.	670,000.00
Office Building, Godowns, Machine Shops and Dwelling Houses, including Ground, 3*m*. 7*f*. 6*l*. 4*h*	110 850.00
" Cosmopolitan Dock:	
"Cosmopolitan Dock," Property with Pumphouse, Pumps, Boilers, etc., including Ground, 45*m*. 2*f*. 1*l*. 7*h*	554,000.00
Land including Bunding, Wharves, and Wall, 107*m*. 5*f*. 8*l*. 6*h*	94,000.00
Machine Shops, Godowns, Office, and Dwelling Houses	100 300.00
108 Chinese Houses, including Ground, 9*m*. 5*f*. 0*l*. 8*h*	29,000.00
" International Dock:	
"International Dock," Wharves and Bunding	580,000.00
Land, 125*m*. 8*f*. 1*l*. 3*h*	90,479.00
Buildings	78,569.00
" Tunkadoo Dock:	
"Tunkadoo Dock," Property with Buildings, Boilers, Pumps, Shear Legs, etc., 35*m*. 6*f*. 9*l*. 5*h*	178,500.00
" New Dock:	
"New Dock," Property with Buildings, Boilers, Pumps, Shear Legs, etc., 48*m*. 4*f*. 9*l*. 2*h*	671,488.00
" Engine Works, Pootung:	
Property with Buildings, Shear Legs, and Railway, 54*m*. 3*f*. 1*l*. 8*h*	365,014.00
" Sundries:	
Machinery and Tools at five Docks and Engine Works	1,101,452.73
S.S. *München*, *Samshui*, Barque *Elizabeth Nicholson*, 4 Steamers, Launches, Pile Drivers, Pontoons, Steam Dredgers, Shear Legs, Dock Plant, Office and Drawing Office Material, and Furniture	718,776.50
Shares in Public Companies	14,568.29
Stock of Material on hand, and unfinished work *less* Liabilities	1,559,852.37
Sundry Debtors	455,964.70
Cash in Hand	3,983.57
Tls.	7,376,798.16

LIABILITIES.

1904. April 30th.	Tls.
By Shareholders for 55,200 Shares of Tls. 100 fully paid-up	5,520,000.00
" Reserve Fund	850,000.00
" Uncollected Dividends	35,307.00
" Sundry Creditors	486,937.98
" Balance from Profit and Loss Account	484.553.18
Tls.	7,376,798.16

E. & O. E. Shanghai, 2nd July, 1904.

Jas. H. Osborne,
Secretary.

J. R. Twentyman, John Prentice, H. v. Rücker, S. Groundwater, *Directors.*

We hereby certify that we have compared the foregoing Accounts with the General Ledger, the Cash Book, the Bank Pass Books, and other Vouchers, and have found them in conformity. The Stock Accounts have also been found in accord with detailed subsidiary books exhibited, and the securities examined and found in order.

Geo. D. Scott, J. D. Thorburn.
Auditors.

Shanghai, 2nd July, 1904

MARKET REPORT

Courtesy Messrs. Sloan & Mitchell, Manila, P. I., Aug. 8, 1904.

Hemp:—Albay current, $18.25; Leyte, $27 Daet, $10.50; Nueva Caceres (Catanduanes), $19.50; Sorsogon, $26.

Sugar:—Iloilo, No. 1, $5. No. 2, $4.6; No. 3, $4.5; Assorted, $4.6; nom. Taal, $3.50 buyers; Ilocos, $4.

Copra:—Sun dried, $8.50; Laguna, $7.50; F. M. Manila, $8.50.

Rice:—Saigon 2.0 Blanco. Market quiet $4.7 F. O. B. River; Rangoon Market dull $5 F. O. B., River. Pangasinan, 5.2½.

Gum Almaciga:—Mixed, $8 per picul.

Coals:—Japanese $10; Arstralian landed per ton $10.50 landed.

Freight:—To U. S. Hemp str., hemp $40/; To U. K. Sugar str.,—; To U. K. Hemp str., 37/6-ton @ 40/; To U. K. Copra str., 25/ s. 27/6 per; Iloilo to Yokohama Sugar steamers, 40.

Leaf Tobacco:—per quintal Isabela, 1901, 1st to 5th class, $15 to $42; Cagayan, 1901, 1st to 5th class, $11 to $38; Isabela, 1902, 1st to 5th class, $16 to $36; Cagayan, 1902, 1st to 5th class, $10 to $32; Brili 1st class, few stocks offered, $13.50; Brili 2nd class, $11,00; Brili 3rd class, $9.50; Abra Norte, no stocks. Union, no stocks.

LOCAL SHARE QUOTATIONS

Aug. 8, 1904.

(Courtesy Messrs. Benjamin, Kelly & Potts.)

All prices in pesos unless otherwise stated.

Banco Español Filipino, Par ₱200, $300 sellers; American Bank, Par ₱200, $150 sellers, U. S. Cy.; Alhambra, Par $500, $200, sales; Germinal, $650, buyers; Varadero, $100, sellers; Compañía Maritima, $180, sellers; Electricista, $32, sellers; Fabrica de Hielo, $100, buyers; Philippine Company, Ltd., ₱100, $10.

MANILA PRICES AMERICAN LUMBER

Aug. 8, 1904.

Subject to change without notice. One to Ten M. board feet.

Oregon Pine.—Delivered prices. U. S. C. Rough, all sizes, $40.00; S 1 S & T & G. ½. $41,50; S 2 S, $42.00; S 3 S, $43.50; S 4 S, $44.00; T and G Rustic, $51.00.

Redwood—Delivered prices. Mercht No. 1. Rough, all sizes, $47.50; S 1 S and T & G ½. $48.50; S 2 S, $49.50; S 3 S, $50.50; S 4 S, $51.50, T and G and Rustic, $60.00; Rough Clear, $71.50.

Redwood.—Delivered prices. Merchant No. 2. $2.50 less per 1000 feet B. M. on above prices.

Hemlock.—Delivered prices. Rough all sizes, $40.00; S 1 S, $41.00.

Cedar Shingles.—Delivered prices. Bundles of 250 per 1000, $6.50.

Lath.—Delivered prices. Bundles of 100 omit, $0.65.

Moulding.—Delivered prices, per inch lineal foot, 1c.

Doors.—Delivered prices, 6—8" $4.25; 6—10" $4.50. Yard Prices on Lumber $1.50 less p. m.

Engines, Japan.—The Westinghouse Machine Company of Pittsburg has secured a contract for three large engines for shipment to Japan, to be used in the power plants of shipbuilding yards and in one of the principal arsenals. The contract was placed by the Japanese Government. Takata & Co. are agents for the Westinghouse interests in Japan.

Sugar Mills, India.—The Geo. L. Squier Co., of Buffalo, N. Y., recently secured orders for sugar cane mills for export to India and the west coast of Africa.

Mechanical Draft, Japan.—The Buffalo Forge Company, of Buffalo, N. Y., has orders for two large forced draft fans for export to Japan, for installation in the plant of the Tokio Street Railway Company, which is to be equipped with 7,000 horse-power Curtis turbines.

Paper Machinery, Japan.—The New York branch of Mitsui & Co. has an important inquiry in hand for paper machinery to be installed in Japanese mills.

Electrical Supplies, Manila.—The Albert & Jno. Anderson Manufacturing Company, of Brookline, Mass., has been allotted the contract for some thirty miles of line material to be used in the construction of the Manila trolley system.

Cotton Mill Machinery, Japan.—The Draper Company, of Hopedale, Mass., has secured a large contract for cotton looms to be installed in the extensive Miye Cotton Mills, Japan. The contract was placed through the New York branch of Mitsui & Co.

Machine Tools, Japan.—The John Steptoe Company, of Cincinnati, Ohio, has secured some fair-sized Japanese orders recently for machinery tools, for shipment to Yokohama, Tokio, and Osaka, chiefly for installation in arsenals.

Rails, Etc., F. M. S.—Tenders have been invited by the British Crown Agents for the Colonies, acting on behalf of the Federated Malay States Railways. About 2,490 tons of 60-pound steel rails and fishplates are required.

Electric Light Plant, Manila.—The Manila Electric Street Railway Co. have bought out the works and concession of the old Spanish company, La Electricista. The price paid and the details of the deal have not yet been made public. The new owners will use the plant for illuminating purposes until the large central power house for the street railway is completed, when certain changes may be made. The Manila Electric Light Plant is one of the best in the Orient, and has given remarkably good service under the old management, notwithstanding the assertions of the local daily press to the contrary.

Electric Light and Traction, Fremantle, W. Aus.—American equipment will be used in the construction of municipal electric light and traction systems in Fremantle and East Fremantle, Western Australia. The Australasian electrical engineering and contracting firm of Noyes Brothers, who recently opened offices at Perth, have been appointed the engineers. The initial installation will cost about $500,000, and the work is expected to be completed inside of eighteen months. —*N. Y. Ex.*

Electric Light, Sydney, N.S.W.—The additional municipal electric generating plant to be installed for lighting Sydney, N. S. W., is to be supplied by the British electrical engineering and contracting firm of Dick, Kerr & Co. The accepted price was £23,811. The Westinghouse interests tendered at £23,651.

Interest on "Friar Lands" Bonds.—Under date of July 22, the Philippine Commission appropriated $70,000, U. S. C., for payment of the second quarterly interest on the "Friar Lands" bonds, and also $30,000, U. S. C., in payment of the quarterly interest on the certificates of indebtedness sold on behalf of the Insular Government by the Secretary of War. An additional appropriation of $150,000 was also made to cover the expenses of the exhibit at St. Louis.

Vigan-Bangued Road, Provinces of Ilocos Sur and Abra.—Under date of July 15th ulto., the Philippine Commission appropriated the sum of ₱14,700 from the Congressional Relief Fund, to complete the construction and repair of the Vigan-Bangued Road.

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG-MANILA, 1st July, 1904.

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation*	CLOSING QUOTATIONS
											PER CENT	
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g $10,000,000 s $6,500,000 i $250,000	... $1,417,366	31-12-03	Div. of £1.10s. and bonus of 10s. @ exchange 1s. 8⅞=$22,994 for half-year ending 31-12-1903	22-2-04	6¼	$662½ London £68½
National Bank of China, Limited Do. do. (Founders')	1891	o £500,000	(l) 49,925 750	£10 £1	£8 £1	$175,533 c $191,973	........$21,668	31-12-03	$2 (London 3s. 6) for 1903 None	1-2-04 —	5¼ —	$38 buyers $10
Marine Insurances.												
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	$1,750,000 f $569,143 j $784,445 u $906,872	... $1,959,926	30-6-03	$32 for 1902	9-10-03	5¾	$545 sellers
China Traders' Insurance Co., Ld.	1865	$2,000.000	24,000	$83.33	$25	$900,000 f $151,992 j $331,342 u $322,138	.... Nil.	30-4-03	$4 for year ended 30-4-1903	9-12-03	6¼	$64
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	T500,000 h T31,850	..... T271,589	30-6-03	Final of £1 making £2 for 1902	14-10-03	—	T67½
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$700,000 f $37,794	...... $432,475	31-12-03	$12 for 1902	22-4-04	9¾	$130
Canton Insurance Office, Ld	1881	$2,500,000	10,000	$250	$50	$1,300,000 j $50,000	...... $110,551	31-12-02	$15 for 1902	23-10-03	7	$208
Fire Insurances.												
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,170,288	...... $371,110	31-12-03	$22½ for 1902	7-3-04	7¼	$310 buyers
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $125,675 j $2,561	...... $329,047	31-12-03	$6 dividend and $1 bonus for 1902	11-3-04	8	$88
Shipping, Tug and Cargo Boats.												
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d $533,000 f $149,409	........$41,538	31-12-03	$1½ for 2nd half-year 1903	8-2-04	10¼	$31
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	z 60,000	£10	£10	i £205,000 £100,000	.... £5,853	31-12-03	10s. for 1903	7-7-03	5	$106
China and Manila Steamship Co., Ld.	1882	1,500,000	30,000	$50	$50	none	*Dr.* $63,123	31-12-03	$5 for 1900	25-3-01	—	$26 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $8,935	.... Nil.	30-6-03	$3 for year ended 30-6-1903	28-9-03	8½	$35 buyers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$60,000 i $15,093	..........$1,287	30-4-04	Div. $1 80, bonus 40 cts. for year ending 30-4-04. " $0.90, " 20 "	2-6-04	6½ 4¾	$36 buyers $26 buyers
Straits Steamship Co., Ld.	1890	$500,000	(2) 5,000	$100	$100	$400,000 e $21,075 r $18,000 i $130,153	........$33,648	31-12-03	$5 for 2nd ½ year making $13 for '02/3	21-4-04	8½	$155 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000	.... £19,555	31-12-02	Interim of 1s. (Coupon No. 4) for '03	29-1-04	4	23/6 sellers
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	T98,000 d T201,614	.... T865	31-12-03	Final of T1 making T2 for 1903	1-3-04	6	T35 sellers
Shanghai Tug and Lighter Co., Ld. Do. do. Preference	1903	T1,500,000	200,000 100,000	T50	T50	none	...... T55,541	31-12-03	Final of T2½ making T4½ T1¾ making T3½	29-3-04	9½ 7½	T48 sellers T47 sellers
Refineries												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	none	*Dr.* $147,717	31-12-03	Final of $7 making $12 for 1901	27-3-02	—	$183
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	*Dr.* $73,905	31-12-03	$3 for 1897	24-3-98	—	$9 sellers
Perak Sugar Cultivation Co., Ld.	—	T350,000	7,000	T50	T50	T100,000	.... T1,456	30-9-03	T2½ for year ending 30-9-03	17 12-03	4¼	T60
Mining.												
Société Francaise des Charbonnages du Tonkin	1888	F.4,000,000	16,000	F.250	F.250	l F.251,337 a F.1,529,652	...... F.85,706	31-12-02	Final of F.20 for 1903	—5-04	—	$490
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	*Dr.* £7,236	31-3-03	No. 12 of 1s.	28-1-01	—	$7½ sellers
Chinese Engin'ring and Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £20,000	.... £6,671	28-2-03	No. 2 of 1s.	26-10-03	—	T6.30

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation*	CLOSING QUOTATIONS
											PER CENT	
Docks, Wharves and Godowns.												
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$59	*i* $17,500	$425,340	31-12-03	$6 div. & $1 bonus for 2nd ½ year '03	23-2-04	6½	$219 buyers
S. C. Farnham, Boyd & Co., Ld.	1901	T5,520,000	55,200	T100	T100	T900,000	T48,153	30-4-03	Final of T7 making T12 for year ending 30-4-04	20-7-04	8½	T143 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	37,000	$100	$100	$1,950,000	$43,732	31-12-03	$6 for second half year '03	23-3-04	4¾	$255 buyers
Riley Hargreaves & Co., Ld.	1899	$875,000	6,000	$100	$100	$150,000	$40,936	31-12 03	$10 div. and $2½ bonus for '03	7-3-04	6¼	$200 buyers
Do. (Preference)			2,750						$7 dividend for '03		6¼	$110
Howarth Erskine, Ld.	1901	$1,200,000	12,000	$100	$100	$14,000	$29,9?6	30-6-03	$10 div. & $2½ bonus for '02/3	27-8-03	6	$205 sellers
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$1,500,000	30,000	$50	$50	*q* $50,989 $250,000	$28,015	31-12-03	Final of $2½ making $5 for '03	11-3-04	4½	$112
Shanghai and Hongkew Wharf Co.	1902	T2,000,000	20,000	T100	T100	*b* T487,210 *r* T50,913	T22,895	31-12-03	Final of T6 making T11 for '03	23-3-04	8	T150 buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	*r* T6,000	T1,760	31-12-03	T18 for '03	31-3-04	9¾	T187½ sellers
New Amoy Dock Co., Ld.	1892	$40,500	6,000	$6¾	$6¾	$55,500	$489	31-12-03	$1¼ for '03	5-5-04	4¼	$27½
Lands, Hotels and Buildings.												
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*e* $500,000	$51,966	31-12-03	Interim of $6 for '04	27-7-04	8	$151 ex div.
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T800,000 *e* T150,800 *x* T17,114	T37,634	31-12-03	Interim of T3 for '04	18-7-04	7½	T109 sales
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	*i* T54,626	T325	31-12-03	Final of T5 making in all T9 for '03	26-2-04	7¼	T125 sales
China Land and Finance Co., Ld.	1903	T300,000	6,000	T50	T50	—	—	First year	Interim of T2	1-10-03	—	T55
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$636	31-12-03	$2.60 for '03	21-1-04	7½	$38 buyers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	*Dr.* T5,150	31-12-03	None	—	—	T10
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,362	31-12-03	Interim of $1½ for '04	27-1-04	5½	$60
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000 *r* $10,771 *m* $20,000	$3,161	31-12-03	$5 for 2nd half-year for '03	21-3-04	7¾	$134 buyers
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T41,000	T655	29-2-04	Final of T4 making T9 for the year	19-4-04	6	T150 sellers
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(3) 30,000	$25	$25	*q* $22,500	$16,301	30-6-03	$2½ for first half-year '03	11-9-03	7½	$34 sales
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	*n* T13,986	T680	31-3-04	T0.87½ for the year ending 31-3-04.	28-5-04	7	T12 sales
Queen's Hotel (Wei-hai-wei)	1902	T225,000	9,000	T25	T25	—	—	—	First year	—	—	T25
Tientsin Hotel, Ld. *(in liq.)*	—	$12,000	600	$20	$20	none	$4,989	28-2-03	$5 for the year ending 28-2-03	4-4-03	12½	$40
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	*Dr.* T2,123	30-4-04	Interim of T3½	23-9-03	—	T45 sellers
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	*i* $200,607 *e* $50,000	$99,177	31-12-03	90 cents for '03	11-2-04	7¼	$12¼ buyers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	T11,655	31-10-03	T4 for year ended 31-10-03	22-12-03	12¾	T30
International Cotton Manufacturing Co., Ld.	1895	T750,000	(4) 10,000	T75	T75	*n* T30,098	T88,034	30-9-03	Interim of 3 per cent account 1898	30-4-1898	—	T25 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(5) 8,000	T100	T100	none	T15,500	31-12-03	Interim of 4% a/c 1898 on 6,000 shares	1-8-1898	—	T32½ sellers
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	*l* T5,658	T26,389	31-12-03	4% for 1897	2-2-1898	—	T150
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	none	$11,121	31-7-03	Final of 60 cents making $1 for the year ending 31-7-03	15-9-03	6¾	$14½ sellers
Cigar and Tobacco Cos.												
Shanghai-Sumatra Tobacco Co., Ld.	1902	T600,000	(6) 30,000	T20	T20	T24,820 *v* T25,000	T1,091	31-10-03	Final of T3 making in all T6	24-3-03	8¾	T70 sellers
Alhambra, Limited	1898	$60,000	300	$200	$200	$43,000	$57	31 12-03	$125 for year ending 30-6-1900	15-8-01	—	$150 sellers
Philippine Company, Limited	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$9½
Miscellaneous.												
Green Island Cement Co., Ld.	1889	$1,000,000	100,000	$10	$10	$350,000	$32,115	31-12-03	$1½ for 1903	7-4-04	5	$30 sellers
China-Borneo Co., Ld.	1903	$720,000	(7) 60,000	$12	$12	none	Nil.	31-12-03	60 cents for 1903	21-3-04	6	$10½ sellers
A. S. Watson & Co., Ld.	1886	$600,000	60,000	$10	$10	$250,000 *e* $25,000	$2,883	31-12-03	Final of 50 cents making $1 for '03	2-6-04	7¾	$14 buyers
Watkins, Limited	1899	$100,000	10,000	$10	$10	*e* $4,802	$1,042	31-12-03	$1 for 1903	28-3-04	13½	$8 buyers
Singapore Dispensary, Ld	1891	$30,000	600	$50	$50	$19,000	$800	31-7-03	$5 for year ended 31-7-02	11-11-03	7	$70
China Provident Loan and Mortgage Co., Ld.	1898	*p* $1,000,000	100,000	$10	$10	$55,000	$1,171	31-12-03	80 cents for 1903	18-1-04	8½	$9½ sales
Hongkong Electric Co., Ld.	1889	$600,000	30,000	$10	$10	none	$1,747	30-4-04	$1 cents for year ending 30-4-04	18-7-04	7¼	$14½ buyers
	1899		30,000	$10	$5				50 cents for year ending 30-4-04		6½	$8¾ buyers

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation*	CLOSING QUOTATIONS
											PER CENT	
Miscellaneous.—Continued												
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	£21,825	£7,387	31-12-02	£1 dividend and 2s. bonus for '02	16-7-03	—	$160 buyers
Shanghai Gas Co., Ld.	1903	T533,300	10,666	T50	T50	*q* T125,000 T108,172	T7,548	31-12-03	Interim of T3½ for '04	29-7 04	9	T97 ex div.
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T140,000	T7,369	31-12-03	Interim of 15s. for '04	25-7-04	7¾	T385 ex div.
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	T15,259	T2,211	30-4-04	Final of T4 making T8 for '03/4	20-6-04	6	T. T135
Tientsin Native City Waterworks Co., Ld.	1902	T294,100	2,941	T100	T100	none	T413	31-12-03	T2 for half year	9-3-04	—	T. T130 sellers
Hall & Holtz, Ld.	—	$420,000	(*8*) 21,000	$20	$20	$186,000	$13,104	29-2-04	Final of $1½ making $3½ for the year	2-5-04	11½	$30 buyers
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Final of $7 making $12 for the year	29-4-04	9¾	$130 buyers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$50,000	$8,395	31-12-03	$10 for 1903	8-2-04	7¼	$140
Geo. Fenwick & Co., Ld.	1889	$150,000	6,000	$25	$25	$70,000	$10,517	31-12-03	$3.75 for 1903	11-3-04	7¾	$48 sellers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $35,000	$5,844	31-12-03	Final of $12 making $16 for '03	11-2-04	7¼	$230 buyers
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	45,000	—	—	$7½ for second half year '03	...-2-04	9½	$160 sales
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$30,000	$4,283	30-11-03	$20 for year ending 30-11-03	24-12-03	7¼	$280 buyers
Dairy Farm Company, Ld.	1896	$75,000	(*9*) 10,000	$7½	$6	$20,000	$3,029	31-7-03	$1¼ for year ending 31-7-03	20-11-03	6½	$20 buyers
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$3,500	$596	31-12-03	$3 for 1903	2-4-04	8¼	$37 buyers
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377 10s	8,604	12s. 6	12s. 6	none	£161	31-12-03	6d. per share for '03	21-7-04	5½	$5 ex div. buyers
United Asbestos Oriental Agency, Ld.	1896	$100,000	9,900	$10	$4	$14,000	$119	31-5-03	90 cents for year ended 31-5-03	6-8-03	8¾	$10½ buyers
Do. do. (Founders')			100	$10	$10				$29.70		14¼	$210 buyers
Tebrau Planting Co., Lt	1897	$100,000	20,000	$5	$5	none	*Dr.* $24,551	30-4 04	None	—	—	$1¼ sellers
Hongkong Steam Waterboat Co., Ld.	1900	$75,000	7,500	$10	$10	none	$1,548	30-9-03	Interim of 70 cents	10-4-04	8	$19
China Light and Power Co., Ld.	1901	$300,000	30,000	$10	$10	none	$3,739	29-2-04	None	—	—	$9¼ buyers
William Powell, Ld	1901	$120,000	12,000	$10	$10	none	$4,757	30-6-03	Interim of 50 cents for 1903-4	22-3-04	9¾	$10¾ buyers
Steam Laundry Co., Ld	1902	$75,000	5,000	$5	$5	none	—	—	None	—	—	$5
			70,000	$5	$3				First year	—	—	$3
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T334,669 *i* T11,143	T27,187	31-10-03	1st & 2d quarterly dividends of T10	15-3-04 15-6-04	13¼	T297½ sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	7	T71½ buyers
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T10,000	T3,288	31-12-03	Interim of T6 for '04	20-7-04	9	T130 ex div.
Central Stores, Ld.	—	$91,845	6,000	$15	$12	$20,000	$1,253	31-12-03	Interim of $1.20 for '04	20-7-04	11½	$21
Do. (Founders')			123						None	—	—	$100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½	—	First	year	Preferential of 7% for '04	20-7-04	6½	$8 sales
E. L. Mondon, Ld.	1902	T350,000	7,000	T50	T50	none	T3,505	31-12-02	T5 for 1902	2-5-03	12½	T40 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T25,000	T1,942	31-12-03	T6 for 1903	23-3-04	9¼	T65 buyers
Katz Brothers, Ld.	1896	$1,000,000	10,000	$100	$100	$375,000	—	—	$13 for 1903	...-3-04	9¾	$135 buyers
Straits Trading Co., Ld.	1887	$2,500,000	250,000	$10	$10	$650,000	$83,405	30-9-03	$1 dividend and 25 cents bonus for half year ended 30-9-03	2-12-03	8	$37 sales
Fraser & Neave, Ld.	1898	$225.000	4,500	$50	$50	$169.116	$2,706	31-12-03	$5 dividend and $2½ bonus for '03	26-3-04	8	$98 buyers
Maynard & Co., Ld	1901	$34,000	3,400	$10	$10	none	$803	31-12-03	$2 for year ended 31-10-03	...-1-04	8	$26 sales
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	—	—	—	First year	—	—	$50
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	—	—	—	First year	—	—	$25

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS
Chinese Government, 7 per cent. Silver Loan 1886 E.	H. & S. Bk. Cor.	T767,200	T250	2073	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. Plus accrued interest
Hongkong & Kowloon Wharf & Godown Co., Ld., 5½% Debentures of 1894‡	Do.	$500,000	§	all	Half yearly on March 31st and September 30th	par.
Hongkong Hotel Co., Ld., 6% Mortgage Debentures of 1899¶	Do.	$500,000	$500	† all	Half yearly, June 30th and December 31st	par.

a Amortisation Fund.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund.
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m Electric Light Installation Fund.
n Sinking Fund.
o Authorized capital £1,000,000.
p Authorized capital $2,000,000.
q Depreciation and Repair Fund.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.

w
x Extra Reserve Fund.
y
z First issue of 60,000 of which 10,411 unallotted.
1 9,472 shares forfeited.
2 785 shares unissued.
3 7,600 shares unissued.
4 1,616 shares unallotted.
5 842 shares unallotted.
6 Only 13,000 shares issued.
7 14,000 shares unissued.

8 399 shares unissued.
9 1,166 shares unissued.
* Based on last year's dividend.
‡ In exchange for the debentures of 1891.
§ In sums of $5000, $1000, $500 and $250.
¶ Redeemable in 10 years, or at option of Company, the Company giving 6 months' notice.
† 420 held by the Company.
‖
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL		CLOSING QUOTATIONS
									HIGHEST	LOWEST	
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 *1*	10	7.50	......	......	......	......	14 sellers
" " " " *Deferred*				4,000	10	10	......	......	......	......	8 buyers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	600,000	600,000	60,000	10	10	......	......	......	......	3.00 buyers
Kadana Gold Mining Co., Ld.	1901	300,000	220,000	20,000	10	10	......	......	......	......	10 nominal
" " " " *Pref.*				10,000	10	4	......	......	......	......	4 "
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	£16,182	6,209	1	1	......	......	......	......	10 "
" " " *Contrib.*				10,500 *2*	1	19/-	......	......	......	......	9.50 sales and sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30-6-02	......	......	3.75 sellers
Pahang Kabang Ld.	1890	375,000	366,000	360,000	1	19/6	......	......	......	......	0.35 buyers
" " " *Pref.*				15,000	1	1	......	......	......	......	...... nom.
Punjom Mining Co., Ld.	1897	$690,000	690,000	60,000	11	11	......	......	......	......	...... "
" " " *Pref.*				30,000	1	1	......	......	......	......	0.35 buyers
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1	......	......	......	......	...... nom.
" " " " *Contrib.*				110,000	1	11/8	......	......	......	......	0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	200,000	191,250	50,000	1	1	4,873	1s. paid January, '01	6.75	6.50	6.50 buyers
" " " " *Contrib.*				150,000	1	18/10	......	1s. " " "	6.50	6.25	6.25 sales and buyers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 *3*	100	100	......	20 per cent for year ending 31-12-03	......	......	215 sales
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10	......	5 " for year ending 15-2-04	......	......	5.25 sellers
Sipiau Tin Co., Ld.	1899	230,000	230,000	23,000	10	10	8,000	5 " for ½ year ending 30 6-03	......	......	4 sales and sellers
South Raub Gold Ming. Synd. Ld.	1898	100,000	100,000	1,000	100	100	......	......	......	......	10 nom.
Sudu Seremban, Ld.	1900	400,000	400,000	40,000	10	10	......	......	......	......	0.10 in liquidation
The Belat Tin Mining Co., Ld.	1906	300,000	300,000	30,000	10	10	......	......	......	......	10 ......
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 *5*	1	1	......	1s. paid May, '03	......	......	15.50 ......
Duff Development Co., Ld.	1903	£400,000	£350,000	400,000 *6*	1	1	......	......	12	11	11 ......
General.											
Fraser & Neave, Ld.	1898	225,000	225,000	4,500	50	50	112,500	10 per cent and 5 per cent bonus for '03	98	97	98 buyers
H'kong and Shanghai Banking Corporation	1865	10,000,000	10,000,000	80,000	125	125	10,000,000 *9* 6,500,000 250,000 *10*	30s. div. and 10s. bonus at 1s. 8⅞= $22.99.4 per share for ½ year ending 31-12-03	......	......	660 ......
Howarth Erskine, Ld.	1901	1,200,000	1,200,000	12,000	100	100	140,000	10 & 2½ p. ct. bon. for yr. end 30-6-03	......	......	212.50 buyers
Maynard & Co., Ld.	1901	34,000	34,000	3,400	10	10	......	20 per cent for year ending 31-10-03	......	......	25 ......
Riley, Hargreaves & Co., Ld.	1899	875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '03	......	......	200 sales
" " " 7% Pref.				2,750	100	100	......	7 " " " " " "	......	......	112 buyers
Singapore Cold Storage Co., Ld. *Fully paid*	1903	600,000	130,000	1,000	10	10	......	......	......	......	10 nominal
" " " " *Contrib.*				24,000 *4*	10	5	......	......	......	......	5.10 ......
Singapore Dispensary Ld.	1891	30,000	30,000	600	50	50	19,000	10 per cent for year ending 31-7-03	......	......	70 sales and sellers
Straits Ice Co., Ld.	1884	200,000	200,000	2,000	100	100	45,000	7½ " for ½ year ending 31-12-03	......	......	170 sellers
Straits Steam Ship Co., Ld.	1890	500,000	421,500	5,000 *7*	100	100	400,000 169,228 *11*	5 per cent for ½ year ending 31-12-03	......	......	160 sellers
Straits Trading Co., Ld.	1887	3,000,000	2,500,000	300,000 *8*	10	10	700,000 1,021,395 *12*	10 p. ct. & 25cts. bon. ½ yr. end 31-3-04	37	36	36.50 buyers
Tanjong Pagar Dock Co., Ld.	1864	3,700,000	3,700,000	37,000	100	100	1,950,000	$6 for half year ending 31-12-03	252.50	250	250 buyers
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000	......	......	......	......	......	......	......	......	......	......	3 per cent prem.
Singapore Municipal 6 " ... 400,000	......	......	......	......	......	......	......	......	......	......	... " nominal
" " 5 " ...1,878,000	......	......	......	......	......	......	......	......	......	......	1 " prem. buyers
" " 4 " ... 655,500	......	......	......	......	......	......	......	......	......	......	2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000	......	......	......	......	......	......	......	......	......	......	2 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000	......	......	......	......	......	......	......	......	......	......	2 " prem. buyers
" " " " 5 " 1,365,500	......	......	......	......	......	......	......	......	......	......	par buyers

1 3,500 unissued.
2 13,293 "
3 2,000 "
4 35,000 unissued.
5 10,815 "
6 50,000 "
7 785 unissued.
8 50,000 "
9 Special Gold Reserve Fund.
10 Insurance Fund.
11 Sundry Reserves.
12 Sundry Reserves.

Singapore, 21st July, 1904.

FRASER & CO., SHAREBROKERS.

•• COMMENTS ••

By the Press of the Orient on the first number of the FAR EASTERN REVIEW.

Publisher's Note:—We desire to express our sincere appreciation for the many complimentary comments and notices bestowed on the Far Eastern Review by the local and foreign press of the East. We also take this occasion to acknowledge the receipt of the many personal letters from editors, professional men, and commercial firms, conveying sentiments of their approval and best wishes for our success, and to record our gratification and thanks for the friendly spirit so displayed.

From the ***Eastern World,*** Yokohama, July 16th, 1904.

The first number of the above named journal, which is published at Manila, P. I., and is to appear monthly, has reached us, and we must say that it is a handsomely got up paper, full of matter of commercial and industrial interest, the collection and editing of which must have cost much money and hard work of a high order, which only those engaged in similar work can appreciate at its full value.

We quite agree with our new contemporary when it proposes to exclude gossip, comic stories, and personal anecdotes. All matter of that kind often only is simply a poor apology for lack of editorial ability and an insidious waste of the time of the reading public, which generally submits to the imposition from sheer indolence, and gradually falls into the habit of neglecting the more important matters discussed in the editorial columns. In the course of time, therefore, the attentive newspaper *reader* becomes an easily wearied newspaper *tippler*, who pays no attention to the *quality* of the matter put before him, and who thus soon subordinates his interests and their earnest advocacy to a lazily acquired taste for this or that, from a *quantity* of clippings, although it may not contain a single idea that is of any value to him, or which may help him to form new ideas of his own.

We are pleased to note, therefore, that the Far Eastern Review at the very outset proclaims that it will not fall into the lazy old rut.*** Typographically also, we may finally say, the Far Eastern Review is a credit to its publishers, so that, all in all, we fully share its hopes as to its future success. The editor has our best wishes.

From the ***Japan Daily Herald,*** July 13th, 1904.

The Far Eastern Review is the latest journalistic venture in the Far East. It is a monthly review of engineering, commerce, and finance, printed and published in Manila. The first number to hand gives promise of it filling a long felt want and enjoying a long life of usefulness. The Review is admirably put together, printed on excellent paper, and enclosed within substantial yellow covers, on the title page of which, within the space enclosed by an archway and fluted pillars, is a skeleton map showing the scope of the new journal's operations from Brisbane in the South to Vladivostok in the North, and from Calcutta in the west to Yokohama in the East. That it covers this ground is amply testified to by the contents—a series of illustrated articles on development of enterprises in the Philippines and terse paragraphs dealing with stocks, mining, and finance in all parts of Eastern Asia and Australia. The editor acknowledges no competition; as he truly says, the Far Eastern Review stands alone, the only paper of its class published in the Far East. Free absolutely from the taint that has characterized American-Manila journalism in the past, and discussing solely subjects of interest to men of business and intellect, the Far Eastern Review is a welcome and creditable addition to the letterpress of the Far East. It is "a serious paper for serious men."

From the ***Capital,*** Calcutta.

We have received a copy of the first number of the Far Eastern Review published in Manila. It is a monthly journal of engineering, commerce, and finance, and it has made a good beginning. The magazine is printed on toned paper, thus affording an excellent medium for the reproduction of the numerous illustrations which abound throughout the pages, furnishing an excellent representation of the scenery in the P. I. and of the various branches of work now going on vigorously under the auspices of the American government. When looking at the thorough-going, systematic, and scientific fashion in which all the natural resources of the Philippines are being developed, one cannot help imagining what India would become during the next half century, if she were governed by the United States of America, or if Great Britain were to give the contract for the development of this Empire to the U. S. A. and allow all the present bewitched crowd of the heaven-born pay, privilege leave, and pension mongers to go to their own place! It is high time for Britain to awake out of her sleep in all that relates to the well-being of India. Even the Philippines will soon be half a century ahead of India in everything that goes to make up true civilization."

From the ***South China Morning Post,*** June 25th, 1904.

We have received the first number of a new paper from Manila, called the Far Eastern Review. It is handsomely got up, exceedingly well printed, and contains about thirty illustrations. According to the editor, it is a commercial and engineering journal. "It has no political party or special trade clique to support. Its best efforts will be devoted to advancing the general prosperity of the Islands, regardless of party or personal interests. Its columns will be dedicated strictly to articles and items having this end in view. Our aim is to assemble together the vast amount of industrial and trade information of the East, so as to show at a glance the business opportunities in various lines, making the review of general interest and value, not only in the commercial centres of the East, but to the capitalists and manufacturers of the United States and Europe."

If the publishers are able to keep up the standard of their first number in their future issues, the Far Eastern Review should be a big success, as it is certainly an able, useful, and illuminating journal for business men. It is published at the McCullough Building, Plaza de Goiti, Manila.

From the ***Nagasaki Press,*** July 8th, 1904.

We have received the first number of the Far Eastern Review, a monthly paper devoted to the engineering, commerce, and finance of the Far East. The publisher is Mr. Geo. Bronson Rea, M.E., McCullough Building, Manila, P. I. The issue contains 48 pages and cover and, if usefulness is any criterion, has come to stay. Specially written and illustrated articles are given by competent writers, all bearing on the subjects enumerated above, and to business men the publication should prove of great value. In an editorial notice it is described as "a serious paper for serious men," and we hope that it will receive sufficient support to enable it to fulfil its mission and advance the interests of all connected with trade in the Far East.

From the ***Kobe Chronicle,*** Kobe, Japan, July 9th, 1904.

We have received the first issue of a new Philippine Islands publication, the Far Eastern Review. It is certainly an excellent production, and if in general appearance the style of No. 1 is maintained, the latest addition to Manila journalistic enterprises will compare very favorably with anything of the kind at home or abroad. There is a great deal of interesting information within the attractive yellow covers, and in helping to develop the trade of the Philippines and the Far East generally its mission is a useful one.

From the ***Perak Pioneer,*** 9th July, 1904.

We have received the first number of the Far Eastern Review, which is a very well got up illustrated magazine published at Manila. The avowed object of the magazine is to advance the commercial, agricultural, and industrial development of the Philippines, which have a magnificent future before them under the ægis of American rule. These islands have already made considerable progress since their annexation. Manila, the chief city, has been transformed. This is the era of development for not only the Philippines, but of Eastern Asia; and we consider this new venture has been opportunely started under very favorable conditions. We wish the enterprising promoters of the magazine every success. Among its varied contents there are two articles which will be found of special interest; one on the "Manila Water System" and the other on "Modern Rice Culture."

From ***The Indian Planter's Gazette,*** Calcutta.

A new monthly publication, The Far Eastern Review, has just started on its career in Manila in the Philippine Islands. The first number is certainly a most excellent one. The subjects, which it is intended shall be specially dealt with, are Engineering, Commerce, and Finance. The policy of the journal is "a faithful presentation of facts regarding the industries and undeveloped resources of the Philippines and the Far East, the attraction of capitalists to the many opportunities for profitable investments, and indicating to manufacturers the openings for the extension of trade." The review is well illustrated, and the reading matter furnishes a mass of the most valuable information regarding the Far East to engineers and merchants. The publisher is Mr. Geo. Bronson Rea, M.E., and the office address, McCullough Building, Plaza de Goiti, Manila, P. I.

From ***The Ceylon Observer,*** Colombo.

The Far Eastern Review.

Under this title a new illustrated monthly periodical makes its appearance. It is an American journal hailing from Manila, well printed on fine paper and with very fair illustrations. It is to be devoted to the interests of trade and commerce, engineering and finance, and the industrial development of trade in the Philippines and Far Eastern countries. The "Review" declares its policy to be "a faithful presentation of facts regarding the industries and undeveloped resources of the Philippines and the Far East, the attraction of capitalists to the many opportunities for profitable investments, and indicating to manufacturers the openings for the extension of trade." As such a paper we welcome it and wish the "Review" all prosperity in the future.

NEW AYALA BRIDGE.

MANILA, P. I.—The Municipal Secretary of Manila authorizes the publication of the following advertisement:

"City of Manila, Office of the Municipal Board, Manila, P. I, June 18, 1904. Sealed Proposals will be received at this office until 12 o'clock noon of the first day of December, 1904, for the construction of the superstructure for a bridge over the Pasig river, in the city of Manila, in accordance with the plans on file at the office of the City Engineer.

"Bids will be received: (1st) for the delivery and erection of the structure complete in every respect and ready for use; (2nd) for the delivery at the wharf in Manila, free from all encumbrances, of all the structural material of every sort, ready for the erection of the bridge complete.

"Each bid shall be accompanied by: (1st) a stress sheet showing the maximum live and dead load stresses in each member, together with the gross and net sections and the material of which each member is to be composed; (2nd) a certified check payable to the city of Manila in the sum of five thousand dollars ($5,000) United States currency, as a guaranty that the contractor will within ten (10) days from the awarding of the contract enter into contract with the city of Manila for the faithful performance of all the work above specified.

"A bond of ten per cent (10 per cent) of the accepted bid will be required for the faithful performance and completion of the contract within a period of fifteen months from the date of signing the contract.

"Printed forms for bids, plans, and necessary information may be obtained at the office of the City Engineer, Manila, P. I.; Engineering News Publishing Co., 220 Broadway, New York City; and the Bureau of Insular Affairs, Washington, D. C.

"The right is reserved by the city of Manila to reject any or all bids and to waive any defects.

"All structural work shall be designed in accordance with Cooper's Specifications for Highway Bridges, Class A 1, Edition of 1901, except as hereinafter noted. Clearances and the general design shown must be followed:

"The trusses, etc., shall have riveted connections throughout.

"All castings shall be steel and no material, less than three-eighths inch thick. The flooring on the roadway will be asphalt laid upon a bed of concrete. The sidewalk shall be of cement laid upon a bed of concrete.

"All freight, customs duties on material, royalties on patent devices, etc., shall be paid by the contractor and the city of Manila fully protected from any liability therefor.

"The city will construct all masonry and foundations, and remove the present bridge.

"The contractor shall furnish the city with tracings of all general and detail plans; and all plans, material and work, of every sort, shall be subject to the inspection and approval of the City Engineer of Manila.

"By direction of the Board:

"JOHN M. TUTHER,
"Secretary."

Office of the Insular Purchasing Agent.—Manila, P. I., August 15th, 1904.—NOTICE.—Sealed Proposals, in triplicate, subject to the usual conditions, will be received at this office until 11 a. m., August 25th, 1904, at which time and place they will be opened in the presence of attending bidders, for furnishing and delivery of 25 Teak Logs, 24 in. square and 16 to 20 ft. long, also various Chains, Sinkers, Shackles, and Ballast Balls.

Apply to this office for specifications and forms. C. P. 155. E. G. SHIELDS, Insular Purchasing Agent.

General Supplies, Office of the Insular Purchasing Agent.—Manila, P. I., August 1st, 1904.

NOTICE:—Sealed Proposals, in triplicate, subject to the usual conditions, will be received at this office until 11:00 a. m., September 15th, 1904, when they will be opened in the presence of attending bidders, for furnishing and delivery into our warehouse of a large list of general supplies in hardware, canvas, paints, oils, etc., consisting of *103* items, and all sizes and quantities of each item.

Bond or certified check in the sum of 10 per cent of bid must accompany same.

Forms and specifications can be had on application to this office, C. P. 153.—E. G. SHIELDS, Insular Purchasing Agent.

The list of articles to be purchased include 430 Boiler tubes; 600 air and gauge cocks; 6 steam indicators, 6 Deering's mowing machines; 24 steam gauges; 40 anvils; 50 crowbars; 748 sledges; 2000 lbs. horseshoe nails; 47 reams emery paper; 47 reams emery cloth; 130 reams sand paper; 40 reams garnet paper; 10,000 sheets corrugated iron roofing; 150 sheets galvanized iron, flat; 2000 lineal feet ridge roll; 5,400 lbs. galvanized iron fence wire; 12,000 feet linen hose; 11 tons standard I beams; 2 tons standard z bars; 9 tons angle bars; 315 bars mild steel, round; 60 steel plates; 70 bars mild steel, square; 300 bars round steel; 1300 bars of best round Norway iron; 400 bars half round Norway iron; 375 bars flat Norway iron; 350 bars of Norway or Burden's best iron; 15,000 feet of galvanized iron pipe; 650 extra couplings; 900 assorted pipe fittings; 6000 lbs. of galvanized iron wire; 100 cases of steel cut nails; 300 cases and 2.0 kegs of assorted wire nails; 300 bales of oakum; 200 ash oars; 5000 lbs. of antifriction metal; 2150 lbs. of blank square nuts assorted sizes; 2000 lbs. of standard nuts threaded; 4200 lbs. assorted lag screws: 1100 lbs. of coach screws; 270 bolts of canvas; 1,000 gals. of crude carbolic acid; 1,000 lbs. of tripoli; 1,200 lbs. of packing; 800 lbs. packing; 6 rolls solid rubber packing; Usudurian and Garlock packing; 500 lbs. Hydraulic leather; 2,250 feet garden hose; 60 sets of Studebaker Dump-cart Harness; 175 kegs of horse and mule shoes; 1200 scrub brushes; 50,000 lbs. of assorted soaps; 1,000 lbs. wire staples; 30 gross of thread; 25,000 lbs. of waste; 1,000 gals. of turpentine: 50,000 lbs. of white lead; 40,000 lbs. of dry red lead; 25,000 lbs. white zinc; 2,000 lbs. whiting; 15,000 lbs. oxide of iron; about 10,000 lbs. of assorted colors in oil; 100 gals. graphite paint; 400 gals. Dixon's graphite paints; 30 crucibles; 216 augers; 24 boxes, awls; 24 boxes scratch awls; 16 doz. sliding bevels; 18 doz. bibbs; 24 doz. bits; 78 doz. assorted bolts; 24 doz. brass bolts; 16,000 tire bolts; 7 doz. braces; brads; butts; cupboard catches; chains; files; gauges; tool handles; handcuffs; hatchets hooks; jack screws, locks; padlocks; nail pullers and hoof nippers; picks; pinchers; stocks and dies; carpenters' planes; screw plates; pliers; rules; saws; screws; oilstones; solder; snips; washers; and saw clamps. For further information and complete specifications apply to the Insular Purchasing Agent, Manila, P. I.

Notice to Contractors--Manila, P. I., August 5, 1904.—SEALED PROPOSALS will be received at this office until 12:00 o'clock of Monday, August 15, 1904, and then publicly opened, for furnishing all materials, work and machinery, of every sort, and for docking the S. S. PLUTO, scraping her bottom, and painting same up to the water line with three coats of anti-fouling paint, placing necessary draft marks, etc.

Printed forms for bids, plans, specifications, and all necessary information, may by obtained at the office of the City Engineer, City Hall, Manila, P. I.

Each bid must be accompanied by a certified cheque, made, payable to the City of Manila, or cash, to the amount of two hundred (200.00) pesos, Philippines currency.

The City of Manila reserves the right to reject any or all bids and to waive any defects.

By direction of the Municipal Board --JOHN M. TUTHER, Secretary.

Office of the Insular Purchasing Agent.—Manila, P. I., Aug. 6th, 1904.—SEALED PROPOSALS, in triplicate, subject to the usual conditions, will be received at this office until 11 a. m., August 15th. 1904, at which time and place they will be opened in the presence of attending bidders, for furnishing and delivery of certain Iron, Rivets, Police Equipment, Insulating P. and B. Paint, and Fodder.

Specifications for bidding may be had on application to this office.—E. G. SHIELDS, Insular Purchasing Agent.

High School.—Romblon, P. I., July 25.—Bids for the construction of a Provincial High School building will be received at this office up till 10 a. m., August 31, 1904, and will then be opened in the presence of the interested parties for the purpose of awarding the contract for said construction. The right to reject any or all bids is reserved.

Plans and specifications for the proposed building can be seen at Bureau of Architecture and Construction of Public Buildings, Manila.

Each bid should be placed in a sealed envelope and clearly marked: "Bid for the construction of Romblon Provincial High School."—(Sgd.) JULIUS S. REIS, Supervisor-Treasurer, Romblon.

Federated Malay States Railway Tug Boat.—Tenders are invited for a composite tug boat and passenger steamer similar in design to the F. M. S. Railway ferry steamers.

Dimensions about:

Length over all	90′ 0″
" B. P.	85′ 0″
Beam	18′ 5″
Depth	8′ 6″

C. S. C. Engines (Twin Screws) capable of driving the vessel at 12 knots on trial or a continuous speed of 11 knots per hour without forcing for a prolonged period.

Vessel to be fitted with modern towing appliances and to have all upper deck fitted with seats for first class passengers, and main deck fitted with seats to accommodate second and third class passengers.

Two lavatories to be fitted forward of machinery casing.

Powerful steering gear to be provided.

Life saving rafts and appliances and one small boat carried on davits above awning to be supplied.

Strong fender to be fitted all round and all upper structure to be kept well inboard.

Tenderers are invited to provide their own designs based on the general dimensions and particulars stated above.

The vessel to be fitted out complete in every respect for the purposes required, and to be delivered in Penang Harbor or at Prai Railway Station.

1. Twin screws to be protected.
2. Rudder to be extra large, and steering gear very powerful and at the same time arranged to go hard over to hard over quickly.
3. Wood fender to be carried round bow and stern. Rattan or rope fender to be supplied stem and stern.
4. Scantlings to be in accordance with Lloyds or Board of Trade requirements.
5. Accommodation, general style, and type of Fittings to be similar to existing Railway Ferry Boats.
6. Draft not to exceed 7.0 aft and to have forefoot out well away for freedom in turning.
7. Full inventory of equipment to be supplied by Tenderers.
8. Vessel to be supplied with high Service Fire Pump.

1,000 feet 3″ canvas hose in lengths of not more than 100′ each, all fitted with Standard brass couplings after Penang Fire Brigade pattern, and complete sets of nozzles, &c., &c.

Pump to be of best design for supplying four ⅞″ nozzles at high pressure.

Sealed tenders endorsed "Tender for Composite Tug Boat and passenger steamer combined" will be received up to noon on 3rd October, 1904, and should be addressed to the Federal Secretary, Kuala Lumpur.

The Government does not bind itself to accept the lowest or any tender.

July 14.

Office of the Insular Purchasing Agent.—Manila, P. I., August 16th, 1904. NOTICE.—Sealed Proposals, in triplicate, subject to the usual conditions, will be received at this office until 11 a. m., August 30th, 1904, at which time and place they will be opened in the presence of attending bidders, for furnishing and delivery into the I. P. A. Warehouse, various Stationery, Paints, and Paint Brushes.

Apply to this office for specifications and forms. C. P. 156. E. G. SHIELDS, Insular Purchasing Agent.

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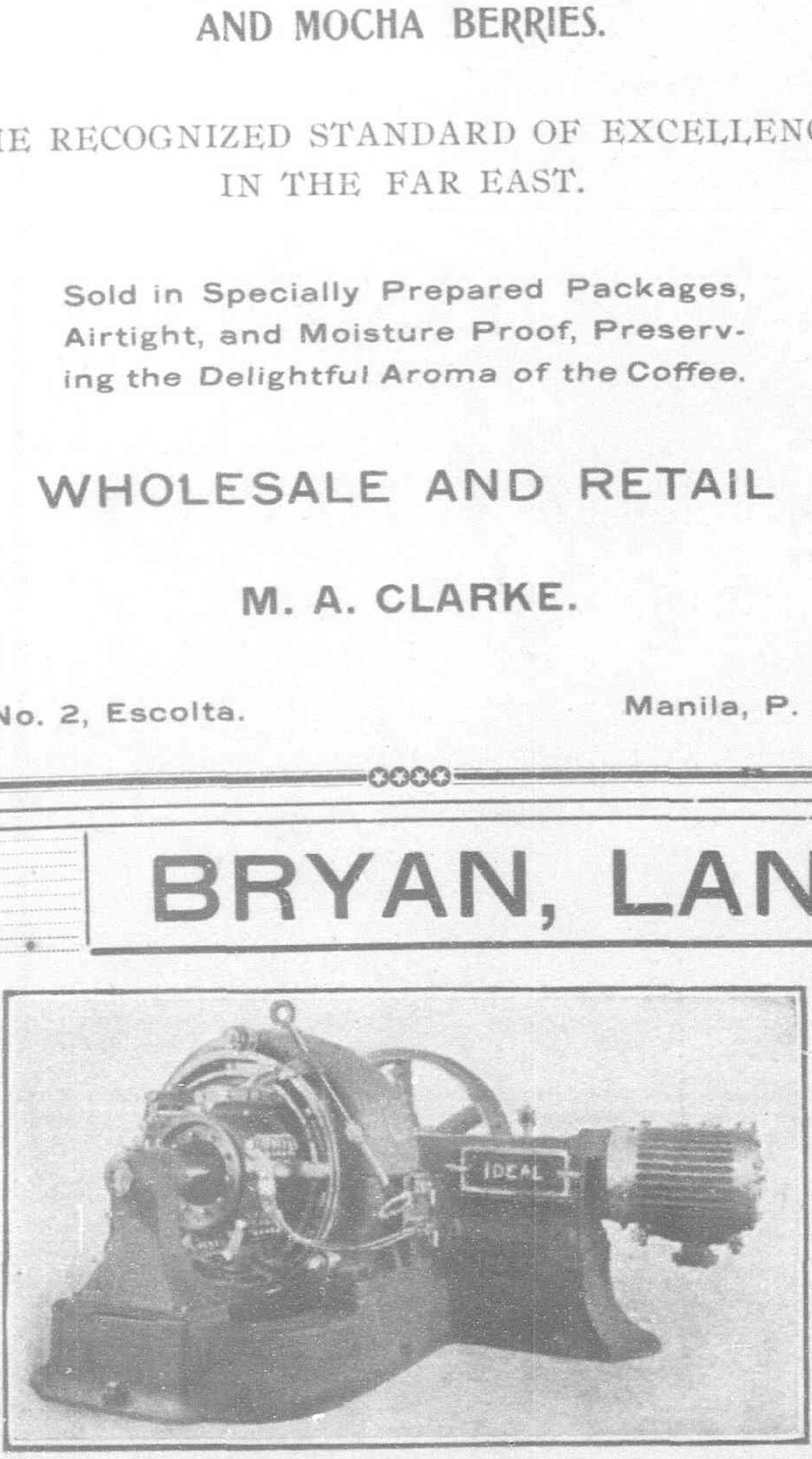

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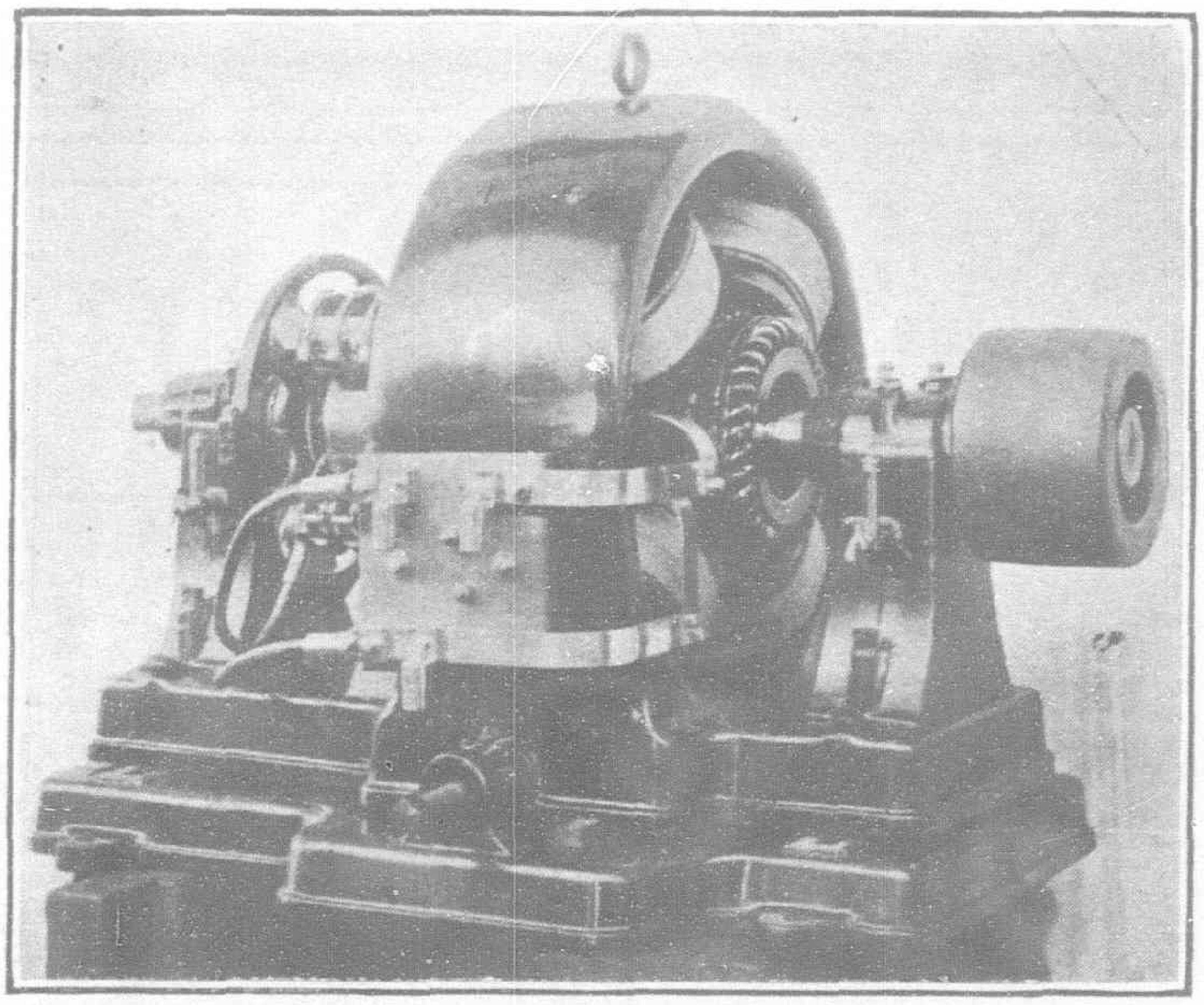

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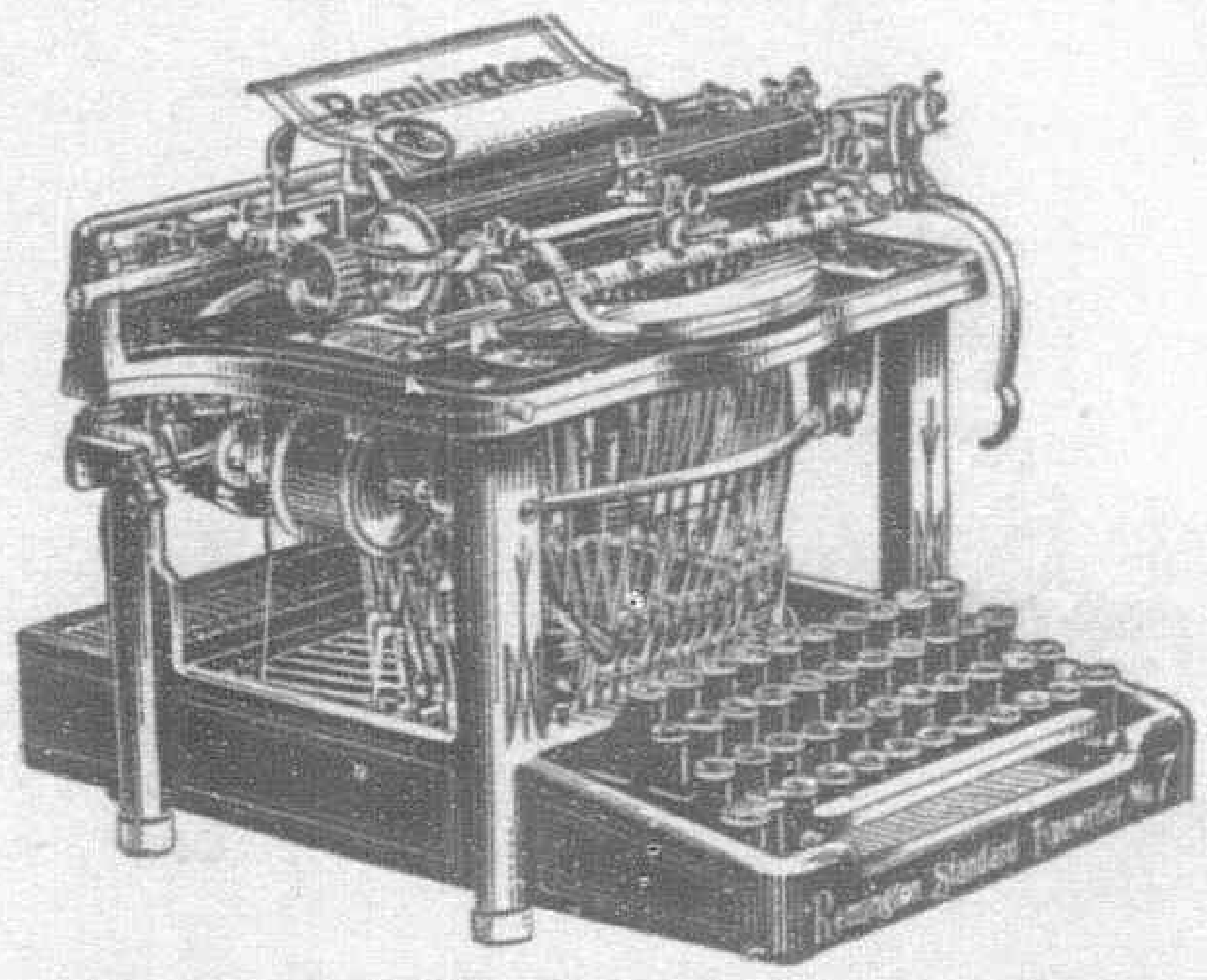

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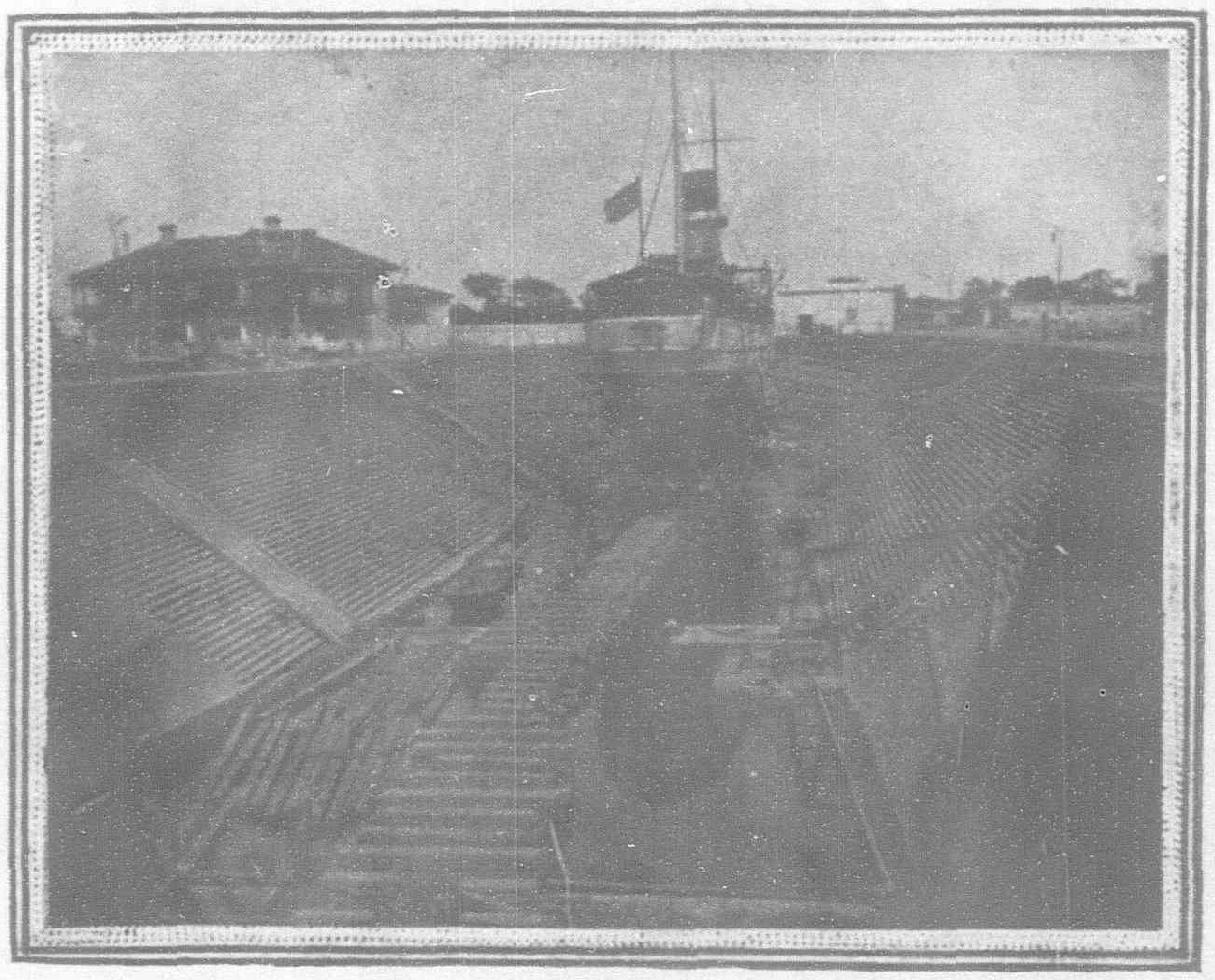

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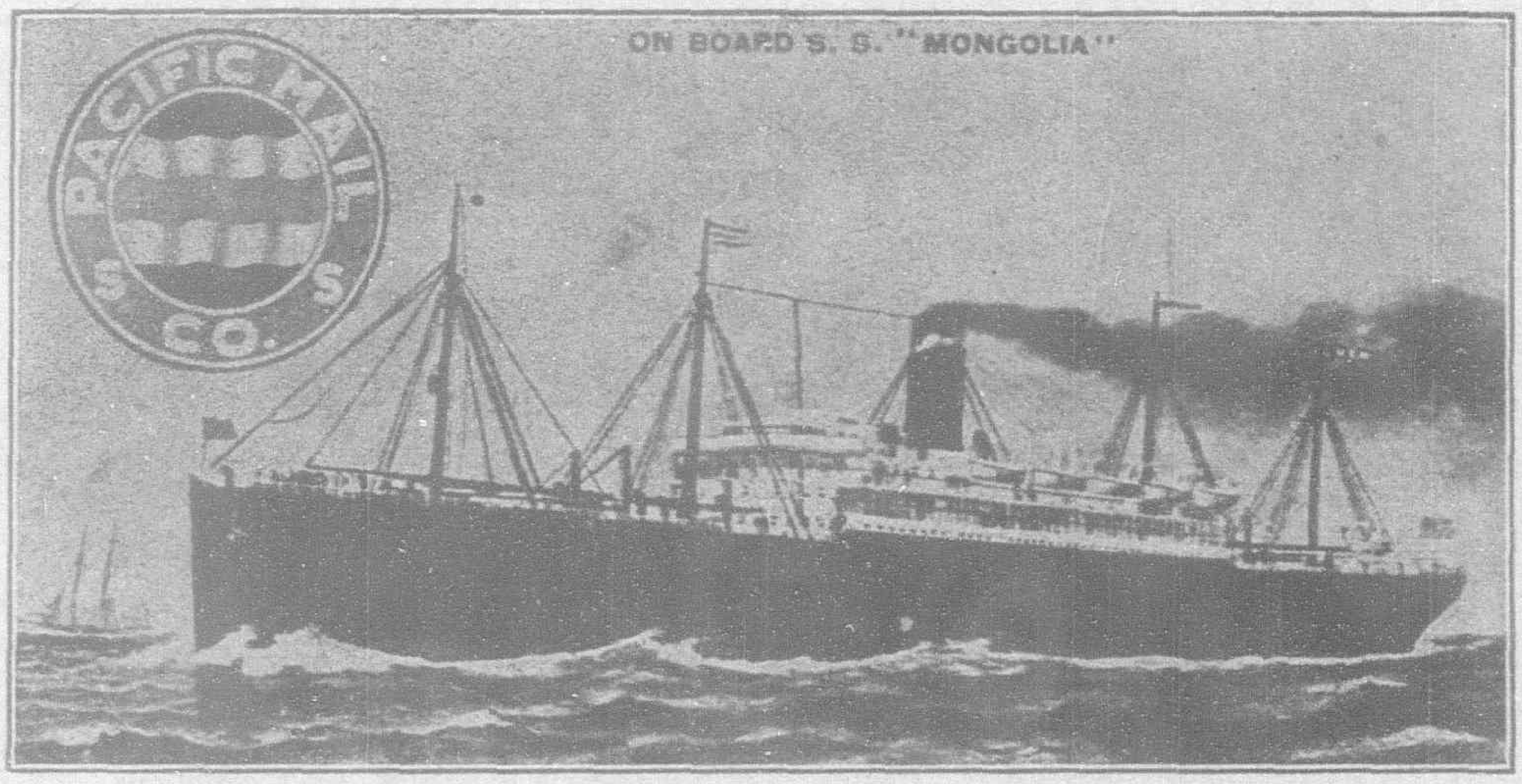
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